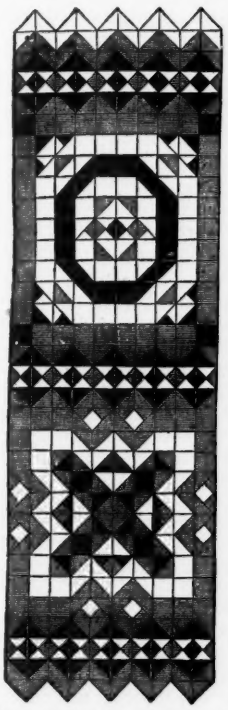
The Builder.

VOL. XXX.—No. 1524.



Pressure on Foundations, and Strength of Materials.

In late years, the methods of forming foundations mentioned in our last,* have been generally superseded by that of sinking into the bed of the river long upright cylinders, formed of rings of iron plates bolted together, by which means much greater depths of foundation can be attained at (in most cases) a mere fraction of the cost required for the expensive system of coffer-dams. These cylinders are usually sunk in the following manner. A frame or staging of timber piles is first erected around the site of the cylinder, and a sufficient length of cylinder is then lowered from a platform on the top of the stage, to rest on the bed of the river. The cylinder is kept in its precise position, as well as kept truly upright, by cross-timbers laid horizontally from pile to pile of the staging, at two or three different levels above the water-surface, which prevent all lateral movement in the cylinder, though they do not impede its vertical descent. The soil is then excavated from the interior of the cylinder, either by workmen in diving-dresses or by machinery specially provided for the purpose; and the cylinder itself is weighted heavily by "pigs" of iron or other convenient loading being placed temporarily around its inner circumference. The result of this operation is, that as the soil is removed from the inside of the cylinder, its lower edge forces or cuts its way downwards from the influence of the heavy loading, and the cylinder gradually descends through the soil till the required depth is reached. As this takes place, fresh rings of iron plates are added on the top, so that the upper portion of the cylinder is always kept above water, and is retained by the timber guides above mentioned in a vertical position. The outside surface of the cylinder, which is in contact with the guides and with the soil below, is formed to present always a smooth surface; and all the flanges or projections by which the several rings are bolted together are kept on the inside of the cylinder, and serve also the double purpose of carrying the pig-iron loading for assisting the sinking of the cylinder.

By this method cylinders have been carried down to 100 ft. below water-level, and to even greater depths occasionally; and the cases are comparatively rare where a solid bottom cannot thus be reached.

It is then usual to fill the cylinders with concrete, made of hydraulic lime or cement, and thus to render them suitable for supporting the superstructure of the bridge. In some cases the upper rings of the cylinders above the level of lowest water are removed, and the portion of the pier above that level is built up in masonry, so as to present the appearance above water of an ordinary brick or stone pier.

The pressure on the foundations in this case is evidently caused not only by the weight of the superstructure, but by that of the cylinder itself, and of the concrete which fills it. When the depth of the cylinder is considerable, the weight of the concrete makes so large an addition to the pressure on the foundations, that it is frequently very difficult to so apportion the size of the cylinder that the area of ground on which it rests shall have sufficient bearing-power for sustaining the load which it has to carry. In such a case every contrivance is used to lighten this pressure, both by diminishing the size of the cylinder above the river-bed, and by making the superstructure as light as is consistent with stability. The friction of the soil on the sides of the cylinder (especially in the case of clay, which has a tendency to swell when cut into), is also useful in aiding to prevent the cylinder from sinking further when the weight of the superstructure comes upon it.

It is also generally found that ordinary soils will bear more weight at great depths than nearer to the surface. This is mainly owing to their becoming more condensed from the superincumbent weight; and also (especially in clay soils), to the increased difficulty of displacing laterally the soil under pressure. This may be understood by considering the action of an ordinary pointed pile, which, as it is driven into the ground, displaces the original material which is forced outwards or sideways, and renders the soil more condensed in its immediate vicinity. A somewhat similar effect takes place in clay under the pressure of superincumbent weight, which causes the soil to yield or ooze away sideways in consequence; and this movement is found to take place with less facility at great depths. An example of this is found in the railway bridge over the Thames at Charing-cross, the pier cylinders of which are stated to exert a pressure of 8 tons to the square foot on their foundations on the London clay; a pressure to which the same soil could not be exposed at a less depth from the surface without causing some risk of undue subsidence.

When sand of good quality, however, is protected from being washed away by running water or heavy rains, it forms an excellent foundation. It is firm and compact in its nature, and when in beds of sufficient thickness, it may be loaded in practice, with pressures of 6 to 8 tons per square foot with perfect safety.

Before proceeding further, however, some practical considerations must be alluded to which modify the question of the amount of pressure which may safely be put upon a given soil.

Suppose, for instance, a solid block of masonry, 20 ft. square and 20 ft. high, and a thin wall of the same material, also 20 ft. high, were placed upon the same soil. On this supposition, the conditions both of soil and of pressure upon each square foot of the foundations would be alike in each case; and yet the thin wall, as regards the stability of its foundation, would be far less advantageously situated than the square block. A much slighter inequality in the bearing-power of the soil would disturb its equilibrium, or throw it out of the perpendicular; and it would also be more liable to damage from external causes affecting the ground on which it stood. Again, if the construction were a tall shaft or column instead of a wall, and therefore capable of being easily deflected sideways in any direction, these liabilities to injury would be still further increased. To place the two structures, therefore, on an equal standing, it is necessary to reduce considerably the pressure on the foundations of the weaker one; and this is generally done in practice. It is customary to extend the foundation courses of a wall or column to a considerable width beyond the face of the superstructure; and various contrivances are used for effecting this purpose. The most usual of these is to extend the width of the foundation by means of footing courses, which, if properly constructed, have the effect not only of diminishing the pressure on the soil, but of otherwise increasing the stability of the structure, by augmenting the leverage with which the foundation resists the force of the wind or other external causes acting on the building above and tending to overturn it.

Where it is desirable from the weakness of the soil or otherwise, to extend the foundation still more than can be conveniently effected by footings, it is usual to place a layer of concrete of still greater width beneath the footings, or to prepare a foundation of timber piling or cross planking upon which the superstructure can be erected.

In this way it generally occurs in practice, that the foundations of thin walls on the weaker soils are compressed to about half the above-mentioned amounts only. But in the piers and abutments of bridges, and in other structures covering a large space in proportion to their height, the pressures indicated above may be generally adopted with security.

The rocky soils, which vary from the hardness of granite, to that of soft crumbling stone easily worn by exposure to the weather or to running water, may be considered in the same category of bearing-power as masonry itself, which will be subsequently treated of. In fact, it scarcely ever occurs in practice that such soils are loaded with the full amount of weight which they are capable of sustaining; the extent of base necessary for the stability of the structure being, in almost all cases, sufficient to ensure a sufficient area of foundation on rock and the harder soils.

The weight of the structure having been calculated, the pressure per square foot on the soil determined, and the area of the foundations deduced therefrom as above described; the base of the structure must be extended, either by footings, concrete, or otherwise, so as to cover that area and transmit the pressure equally and uniformly over it.

Great care is of course required when sudden changes or variations in the soil take place, to ensure that the settlement of the structure, if any occur, shall be uniform over its whole extent.

It now remains to consider the pressures which may be safely adopted on the materials themselves used in foundations, as distinguished from the soil on which they rest.

Good ordinary brickwork will crush with a load of about thirty tons, and may be loaded safely in practice up to ten tons per square foot. Brickwork of the best description, set in Portland cement, can be loaded in practice with double this quantity, although this should be considered an extreme amount; and it is more advisable to keep well within it, especially in thin walls and columns, which are liable to deflection under such heavy pressures; the latter cause of failure being quite independent of the inherent resistance of the material to crushing weights.

The limit of load which should be put upon stonework depends upon the nature and quality of the workmanship as well as upon the hardness of the stone itself. Thus, rubble walls with thick and irregular joints of mortar are weaker than even inferior brickwork for the support of heavy superincumbent weights, while well-bedded ashlar masonry will bear loading to an immense extent. In general, from eight to thirty tons per square foot may be taken as the practical limits of such loading; but so much depends in each case on the quality of the materials and workmanship, that it is impossible to specify more precisely what limit should be adopted in each case, which must be left in a great degree to the judgment of the constructor.

The bearing-powers of concrete may be taken at from six to twenty tons per square foot

* See p. 277, *ante*.

according to the goodness of the materials of which it is composed, and the proportions of lime or cement used in mixing it.

The bearing-power of timber piles is an important feature in foundations, and varies according to the nature of the soil and the size and length of pile driven. The more ordinary application of piles is to drive them through a loose or weak material to a firm stratum underlying it; in which case they may be considered as columns or pillars supporting the superstructure, and stayed or steadied along their length by the contact of the soil through which they are driven. In this case, and under ordinary circumstances, long piles of whole timber driven to the usual extent (as, for instance, that a ton hammer with a 15-ft. fall should not drive the pile more than a quarter of an inch), may be trusted to carry a load of from ten to fifteen tons. Where the soil is very loose or fluid, however, this load should be diminished; as such a soil affords insufficient lateral support to the length of the pile, and allows it to deflect sideways, which materially diminishes its strength. In this case, a greater number of piles is generally used, which has the double advantage of both condensing the soil and of diminishing the loading upon each pile.

Piling is also frequently used in semifluid soils of great depth, where no firm bottom stratum is attainable. In Holland this takes place to a great extent, the large houses in that country being universally built upon a foundation of this description. In the swampy lands of America also, the same foundation is in very general use for engineering works. The bearing-power of the piles in this case consists mainly of the friction or adhesion of the soil to their surface, and this amount varies greatly, according to the nature of the soil. In fine sand, which is a very adhesive material, it has been found by experiment to be fully one ton per superficial foot of the pile surface (the piles being long and fully driven); but this amount of resistance is seldom attained. The load which piles in this condition will sustain may be ascertained with facility by using one of the undriven piles as a horizontal lever to withdraw a pile already driven; the lever having, of course, its short arm attached by a chain to the pile which is to be drawn, and its long arm loaded; the measure of the weight required to draw it will be of course the friction of the ground upon the surface of the pile. The pile should not be loaded in practice, however, with more than one-sixth of the weight sufficient to draw it, when the soil is throughout of a weak and fluid character.

When foundations of planking are adopted (which, though liable to rapid decay in a dry situation or in one where the timber is wet and dry alternately, may be used with a tolerable amount of safety in wet soils), the planks are usually cut in short lengths and laid crossways to the wall; and tied longitudinally together by longitudinal planking under the superstructure, of the full width of the footing course. The longitudinal and cross planks are spiked together and are found to make an excellent foundation. Good timber may be loaded in this position up to eight or ten tons per square foot, and affords an excellent means for distributing the superincumbent pressure over a large surface, which is especially valuable in the case of the weaker soils.

The above remarks show the general principles upon which foundations can be laid with security in the cases most ordinarily occurring in practice. They are, however, necessarily subject to modification in the endless variety of circumstances met with by the practical architect and engineer in the exercise of their profession.

AS TO THE USE AND ABUSE OF ARCHITECTURAL ORNAMENT.

WHAT is "ornament," as used in reference to architectural design? Perhaps it may be defined broadly as including all features, and all treatment or arrangement of material, the introduction of which does not add to the real stability of the structure. But in ornament, as thus defined, there is an important subdivision; and we may recognise two main branches of architectural ornament, viz., that which has for its main object to emphasize and illustrate the functions of various parts of the construction, and which we may call constructive ornament; and, secondly, that which adds nothing to the constructive expression of the building, but is introduced merely to relieve the design, and give it more interest for the eye, and which might be called (to borrow a phrase from the plasterers), "enrichment," or surface adornment. The value of these two classes of architectural ornament is very different, as also are the degree and manner in which they may respectively be employed with advantage; and perhaps a suggestion or two on these points may not be superfluous.

Constructive ornament, when truthful and expressive (and when it is not this it will fail to be recognised at all as ornament), can hardly be too generally admitted in a design; indeed, any important feature destitute of such treatment would give us a sense of bareness and incompleteness, a feeling that the architect had altogether fallen short in his duties. As a typical specimen of what is included under this head, perhaps nothing better could be mentioned than the two or three forms of the Greek column, with its striated or "fluted" shaft, its cap and base. The column being a feature for resisting vertical pressure, the strong vertical lines of the fluting, which add nothing to its strength, nevertheless, emphasize this object, giving sinew, so to speak, to what would otherwise be a nerveless rounded mass, and directing the eye to the vertical line of force in which the column acts. No large column can lose this feature in its design without losing some of its characteristic expression; and the frequent omission of it by the Romans is one of the many instances of their want of perception of the meaning and value of ornament of this description. Such vertical markings on a long Gothic shaft, on the other hand, would be a superfluity, the vertical tendency being sufficiently indicated by the proportions of the shaft, which does not require to have this tendency and expression further exaggerated. The abacus in its simple form is a purely constructive feature, but its ability to take the weight of the architrave and transmit it to the column is emphasized by the ovolo moulding of the Doric capital, which gathers the pressure of the abacus and concentrates it on the column. The lighter Corinthian capital is a less sincere feature in this respect, and, indeed, so far as the foliage which makes its chief glory is concerned, oversteps the line of constructive ornament and becomes enrichment, being, in fact, a forecast of the principle which ruled the Gothic architect; that of using constructive ornament not to emphasize resistance to weight, but to conceal the fact of there being any weight to be resisted. The Greek architect could not achieve this, for he had still the palpable dead weight of his architrave over the column; and in consequence the stability and unity of expression which characterised the Doric style were here weakened, and the Corinthian architect had to pay for the elegance of his foliated capital by the loss of the monumental grandeur belonging to the older and sterner style; no actual magnitude of scale sufficing to restore the grandeur of expression which this one feature had impaired.

An excellent instance of constructive ornament, again, is the use of rustication in masonry, where the junctions of the horizontal layers of masonry which form the wall are marked and emphasized to us to increase the appearance of stability and "bond" between the various parts which make up the mass. This very artifice, when applied to a column, becomes, on the contrary, in most cases a fault and a contradiction, giving a built up and disconnected appearance to a feature which is always best as a monolith, or in as few pieces as possible, and destroying the vertical expression of the column by a series of strongly marked horizontal divisions. The archivolt of the Classic arch, the moulding of the Gothic arch, are equally examples of the true and correct employment of constructive ornament in emphasizing and giving strength to an important feature in the architectural design; and in some cases, as in the set-offs and drip of the Gothic buttress, we find the construction and design so identified that it is almost impossible to discriminate them, and the best form for expressing the functions of the feature becomes also the strongest and most sensible and durable method of constructing it.

It is most with regard to enrichment, however, that caution and judgment on the part of the designer are so necessary. Constructive ornament, being merely the treatment of features which are necessary portions of the building, so as to emphasize their constructive value, imposes its own limits on the architect, and cannot be extended too far without destroying its own object. But in regard to mere enrichment there is no such natural check on the designer, and the views, practical and theoretical, as to the extent and manner in which this class of ornamentation may be used, are various indeed: "Where you can rest, there decorate," said a well-known critic on art and on some other things. A distinguished architect, the late Sir Charles Barry, on the other hand, left on record, in his handwriting on the wall as well as on paper, his opinion that a building could never be too much decorated, provided that all parts of it were treated with equal or proportionate richness. We are inclined to think this a dangerous maxim, and that the truth lies more near the former canon, when adequately interpreted. Surface enrichment of an elaborate description should not, as it seems to us, be applied to features which, like columns, are manifestly doing the heavy work of the construction; indeed, such features admit advantageously of no ornament except that before described, that which emphasizes and helps their constructive expression. Anything which is quite independent of this, tends to weaken the expression and character of the design, by obscuring the real function of the column,—that of supporting weight. In this view the Egyptian column, with its elaborate and varied painted ornament; the Hindoo, with its ragged outline and incrustration of irregular carving; many types of Renaissance columns, rusticated and wreathed, are alike mistakes in treatment. An exception to this rule may be, when the structure in which columns are employed is on a very small scale where lightness and piquant effect are mainly sought, and where the supports really have not much work to do: in such a case the expression sought may sometimes be very much assisted by enriching those portions which in a larger structure should be left plain. In decoration on a wall surface, the portions of the wall which form piers would naturally claim a plain and solid treatment, and surface decoration would be applied to spandrels and intermediate spaces where the principal mass of the structure did not press. It may be said, on Sir C. Barry's principle, that where the pier portions are decorated in a simpler manner, and the richer decoration reserved for the other portions of the surface, there is then no objection to a universal application of enrichment to all parts of the surface. There may be cases in which such treatment might be suitable, and, when carried out with great ease and judgment, successful; but, as a rule, we believe architecture requires perfectly unadorned wall space, more or less, to give the necessary dignity of expression to a large building, and the full value to the portions which are decorated. We can scarcely believe that a building entirely encrusted with decoration can look otherwise than somewhat weak; and such a treatment is likely to defeat its own object, by confusing the eye of the spectator, and leaving him nothing sufficiently marked or definite to rest upon; besides obscuring and overlaying the architectural motive of the design. The Houses of Parliament themselves, however great a work in many respects, furnish, we cannot but think, an instance of over-decoration, leaving an effect of fritter on the eye; and we can feel little doubt that the river front, impressive as it is, would have been far more so had a certain amount of broad untouched wall space been left, to give massiveness to the whole, and greater value by contrast to the decoration of the rest. Internally too, where richness is more allowable and to be expected, this has been overdone. There is this to be said, too, about very extensive surface decoration, that in such a case both design and execution are likely, in a majority of instances, to suffer. In few cases can the architect have time to give for really considering and designing ornament enough to cover a building; in few cases either can money or time enough be spared to have it executed in a first-rate manner. A little original, effective, well-considered ornament, though the rest of the building be left plain, is surely better than a quantity of mere repetition of ornament for the sake of a certain richness of effect, which, after all, is by no means one of the highest aims or results in architectural design; and which, in fact, has a tendency to give to a building a semi-barbaric character, like that of the elaborately decorated Japanese cabinets we were referring to a few days ago.

A glance at the styles of architecture now recognised as the greatest seems to bear us out in this view. The Greek architecture certainly was not overdone with the enrichment; but what there was was of the highest and most intellectual interest possible; being, in fact, nothing less than sculpture of the very noblest school. This, perhaps, hardly comes under the term "ornament," or "enrichment," except in

so far as it answers to our previous definition of this, as decoration applied, independently of construction, to relieve and add interest to the building. But in the Mediæval style we see the full force of the distinction drawn here. The early modern users of this style among us worshipped the panelling and fretwork of the fifteenth-century builders; but as our knowledge and appreciation of the works of the great age of building proceeded, we went back, chronologically, step by step, in our admiration, which is now, for the most part, centred, and rightly so, upon the earlier works of the earliest branch of the Pointed style. And we find here ornament, for the most part, very sparingly applied, but generally very effective in treatment and design, and only placed just where the eye seems to require a point of interest to attract it; a band of carved ornament meeting the eye at the point which separates one style of the design from another, and coming out with a sparkle by contrast with the plain masses of masonry adjoining it. A single line of panelling or diaper over a broad expanse of unbroken wall will often have a most piquant effect, doubling the value of the wall as giving mass to the composition, doubling also its own value by the contrast. When we speak of enrichment, however, as ornament "independent of the construction," we mean this only in a qualified sense. The ornament must be so placed as to fall in with the main lines and sections of the construction, not to cross and contradict them; nor must it contradict, or appear as an excrescence on, the nature of construction employed. In masonry, for instance, a row of small panels, as remarked, along a single course of the masonry, is a legitimate treatment: it is, in fact, treating one course ornamentally (a suggestion which might be extensively adopted and improved upon); but to panel a stone wall over in panels independent of the courses is to ornament it in a manner which contradicts construction; which represents, in fact, the outer aspect of a form of construction only suited to another material. The use of carving, too, in its more elaborate forms needs to be very much checked; the object now, in many of our new buildings, seems to be to carve as much stone-vegetation over them as can possibly be had for the money, and many blocks of offices have nearly as much carving distributed over them as would have served a whole cathedral in the "Transitional" period. This is not only vulgarising what, rightly employed, is a very beautiful source of decoration, but in towns it is often practically the very worst kind of decoration to employ, as likely to be so quickly worn away and choked up, as to its edges and hollows, by the combined influence of soot and dust.

In fine, we would see architectural ornament suited to the material it is worked in, expressive of or harmonising with the construction, and only introduced where it will really be effective and add value and point to the design. To employ a little ornament according to these requisitions will be found, we think, to demand more time and thought on the part of the designer than at present is often bestowed on the incrustation of a whole façade, turned over to the devices of that amphibious person, the art-workman, who is too often allowed to do, after his own fashion, what should be the result of the care and thought of the architect himself.

AMALGAMATION OR STATE RAILWAYS.

Railway amalgamations are not a novelty, although the subject is at present exciting an unusual degree of interest. For more than a score of years past the process of amalgamation by actual purchase or lease has been steadily progressing, and the great systems, as they are called, are composed of dozens of small, originally independent companies. The larger and more powerful company, like the Octopus, concerning the nature of which naturalists have of late been so much exercised, stretches out its tentacle, and for the smaller and weaker company there is no escape. Each fresh acquisition adds to the power of the railway Octopus, and increases the number of its tentaculæ; and we find accordingly that some single companies of the present day, if resolved into their primitive elements, would furnish a goodly roll of some dozens of titles of companies that came into existence with their own distinctive local designations, that are now merged in titles indicating extensive territories; as the London and North Western, at first Liverpool and Manchester, London and Birmingham, joined by the Grand Junction; the Midland, the Great Northern, the Great Western, the South Western, the South Eastern, the North Eastern, &c., all of which had originally in their germs their restricted local titles. Many past railway amalgamations have been effected, "not with observation," but not the less really. The amalgamations now on foot, which have led to the appointment of a joint committee of members of the Houses of Lords and Commons, to inquire into the whole question of the policy of amalgamation, and, incidentally, into the desirability or otherwise of the acquisition of railways by the State, are of another character.

A few months since the railway amalgamations on a large scale, proposed by companies, were four in number. 1. The amalgamation of the Caledonian and the North British Companies, which for the last fifteen years have carried on a ruinous competition and internecine strife with each other. Of late friends of peace in the companies have urged the attempt to arrive at the terms that might be accepted by both as the basis of "a Parliamentary peace," either by an equitable division of competing traffic or by amalgamation. Certain terms were laid down and proposed; but, unhappily, acquiescence of the shareholders of both companies could not be obtained, negotiations were broken off, and the draft Bill consigned to the waste-paper basket. 2. The proposed amalgamation of the London and North-Western and the Lancashire and Yorkshire Companies that would together constitute a corporation of great wealth and power, the united capital amounting to 105,000,000*l*. For this amalgamation there is a Bill before Parliament in the present session. 3. The proposed amalgamation of the Midland and the Glasgow and South-Western Companies, which would give a third continuous route between London and Scotland. For this amalgamation also there is a Bill before Parliament. 4. A Bill now before Parliament to authorise traffic arrangements between the Great Western, the London and South-Western, the Bristol and Exeter, and the South Devon Companies. Mr. Grierson, the general manager of the Great Western Company, in explaining the provisions of the Bill, stated that it was not in any sense an Amalgamation Bill. It will, if sanctioned, be for all practical purposes, as regards rates and charges, and as its provisions will affect the public, an Act amalgamating the companies having railways to the west of a line drawn from Worcester to Oxford, and from Oxford to Portsmouth. The four companies engage to procure the consent to the agreement of the smaller companies in Somerset, Devon, and Cornwall, and the arrangement is to be in perpetuity, subject only to such changes as the contracting parties may agree upon.

It seems surprising that there should be so much divergence of opinion among eminent railway officers, and among men of large experience, as to the policy of amalgamation, and the principles of railway management, as has been displayed in the evidence given before the joint committee presided over by Mr. Chichester Fortescue, president of the Board of Trade. Mr. Cawkwell, manager of the London and North-Western, was called in support of the Amalgamation Bill in which his company is concerned. He admitted that the public should have security in the event of amalgamation, and stated that they would have it in the competition that would still exist. As regarded running powers, it was impossible to give other companies running powers over their line between Liverpool and Manchester, as both the line and the stations were inadequate to accommodate their own traffic, although their stations in Liverpool had cost 4½ millions sterling.

Mr. Allport, general manager of the Midland Company, on the other hand, in supporting the Amalgamation Bill in which his company is interested, said that the Midland must oppose the proposed amalgamation of the London and North-Western and Lancashire and Yorkshire, unless the Midland had running powers conceded to them over the amalgamated lines. Mr. Allport expressed himself as favourable, in general terms, to amalgamation, but with the essential condition of running powers to other companies over amalgamated lines. Such running powers Mr. Cawkwell showed to be impracticable, and the railways in and near London furnish many similar illustrations. Running powers to "foreign" companies over such lines as the Charing Cross, the Metropolitan, the North London, and the metropolitan extensions of other companies could never be more than a name.

A large number of witnesses have been, or are ready to be, examined in opposition to the proposed amalgamations. The opposition has been, in some instances, more nominal than real; and witnesses that have come to ban have remained to bless: instead of opposing, they have approved of the proposal. From the conflicting opinions that have been expressed by the presidents of chambers of commerce, mayors, aldermen, and others, who have been examined, it is evident that these gentlemen have not agreed among themselves either as to the policy of railway amalgamation, the desirability of the State purchasing the railways, or as to the principles of railway management. It is certain that they have not come before the committee with any complete predetermined theory. On certain points there is agreement: that goods' rates, as well as passenger fares between stations should be published by the companies, and that the amount of fares should be printed upon passengers' tickets. On the subject of equal mileage rates there is no agreement. One witness urges that there should be equal charges for equal service over the whole of a railway system. Another witness declares that a rigid system of equal mileage rates would be unwise and impolitic; another pronounces such a system impracticable, inasmuch as there are many instances of more than one railway route between the same points, the one route longer than the other. An equal mileage rate would throw one of the lines out of use for traffic between the two places, unless the rates were reduced over the whole system of the Company owning the longer line. Again, liberal rates were frequently necessary to develop the resources, and to nurse into a state of prosperity, a new mineral or manufacturing district. This had been the case with the Cleveland Iron District. The Government authorities that ought to be appointed over railways, and their functions and powers, are other points on which the opinions of witnesses were widely divergent. One asks for a Board of Control and a Board of Arbitration; another for a Board of Appeal, but without power to determine a matter. One witness was of opinion that it would be of the utmost advantage to the public that the State should purchase the railways. Another witness deprecated the idea of Government taking over the railways, which could not be better managed than they are managed now.

Whatever may be the finding of the joint committee, it seems certain that a great change in railway affairs is impending, and that the tendency is towards concentration either by traffic arrangements, by amalgamation, or by the purchase of the railways by the State.

The time is opportune for recalling some past Acts of the legislature in relation to railways.

In 1844 an Act of Parliament was passed for the purpose of enabling Government to purchase, on certain specified terms, all railways in the United Kingdom from that time forward to be constructed. Under that Act, Government took power to purchase the railways that came under its operation at the end of twenty-one years, which expired in 1865, when five-sixths of the railways of the United Kingdom became subject to its provisions. Government had then the option of purchasing the railways, and a Royal Commission was appointed in the following year, 1866, to determine whether and, if any, what action was to be taken under the Act of 1844. The Commission was also to inquire, *inter alia*, into the economical question connected with our railway system; that is, the cost of conveyance on railways, and into the charges which are made by railway companies to the public. The Commission, consisting of divers "right entirely beloved," "right well beloved," and "trusty and well beloved," cousins and councillors, took a large amount of interesting and valuable evidence, but deterred, possibly, by the magnitude and gravity of the responsibility, did *not* recommend any very sweeping change in the railway system of the country. On the contrary, the Commissioners reported "that it is not expedient at present to subvert the policy which has hitherto been adopted of leaving the construction and management of railways to the enterprise of the people, under such conditions as Parliament may think fit to impose for the general welfare of the public." The Commission made numerous recommendations as to improvement in Private Bill legislation, conveyance of mails, interchange of traffic, conveyance of merchandise and minerals, &c. The Commissioners deprecated interference on the part of the Government with the freedom of those who have provided the capital to fix the rates and

charges at which they may perform their services to the public, and the Commissioners expressly say that it would not be expedient, even if it were practicable, to adopt any legislation which would abolish the freedom railway companies enjoy of charging what sums they deem expedient within their maximum rates when properly defined.

The Report of the Commission cannot be said to point in the direction of a State railway system; but the great amalgamations now proposed, and the certainty that, if these are sanctioned, they will lead to others, until the whole of the railways of Great Britain are consolidated into four or five great companies, will doubtless incite to renewed attention and fresh discussion of the subject. In connexion with this important topic there is a prevalent fallacy in the assumption that the purchase of railways by the State involves their management by the State. The one thing is not by any means a necessary corollary of the other. Provided that the public, the shareholders, and the Government are agreed, there is nothing to prevent the conversion of railway stock into a new species of Government stock; nor is there anything to prevent Government from leasing the working and management of the lines to competent men.

The proprietors of the telegraphs received a bonus of a few millions more than the value of their property; the proprietors of railways are well entitled to as liberal treatment. If the railways can be acquired by Government upon equitable terms, and the difficulties can be avoided of throwing immense power and patronage into the hands of Government, in connexion with the acquisition; if the management of railways can be retained, for the greater part, in present hands; it may scarcely be doubted that a homogeneous railway system might be worked in a manner to confer immense advantages on the community. Under such a system equal mileage rates would present no difficulties. The plethora of the rich and populous districts would be available for the nourishment of those that are poorer and more sparsely peopled. Experiments could be made unhesitatingly in the direction of reduction of fares and charges, and the important problem could be solved with absolute certainty as to the minimum rates and charges that would yield maximum profits.

The time may not be yet come, but it will come, when the prediction of a writer in the *Quarterly Review* nearly thirty years since will be realised:—"It is impossible not to see that the system is developing itself to such an extent, penetrating all districts, superseding all other communications, affecting every species of public and private interests, and acting as the life blood arteries of the empire, as to render it probable almost to certainty, that the time must come when this great public trust can no longer be left to the management of private companies scattered over the face of the country. In truth, it seems only a question of time; railways must be made subject to some unity of management, and through whatever intermediate process it may pass, that management must finally be vested in the Government of the country."

PUMPS AND DRINKING FOUNTAINS.

OUR whole confraternity of working people have a good deal to do and to bear with. Their hours of labour are long, and their work, for the most part, monotonous and unremitting. It is very difficult, if not impossible, for any one who has not had a trial of it to realise to himself what it is to get out of a warm bed at five o'clock on a cold winter's morning to begin some dull, mechanical, and totally uninteresting work; to plod at it all day long, till the nine, or the ten, or the twelve hours are over and gone; and then to find your way to a cold, cheerless room, or, still worse, a dirty coffee-house, of the universal English type. We say it is impossible to realise all this till you have tried it. It is the working man's lot in almost an infinite number of cases; and, what is more, there is at the present moment no escape from it, or the like of it, but the dangerous "public-house,"—a perfect harbour of refuge to such by the side of the aforesaid British coffee-shop. To many, many thousands of single working men does this apply with painful force. Letting this pass, we want to say a word or two about water, *i.e.*, spring-water; common cistern water, as supplied by the water companies; and our public drinking-fountains?

In the first place, it is in the recollection of most that not many years ago there was every here and there in London streets an old-fashioned pump, tall and gaunt enough, with convenient strong handle and iron ladle, from which the coolest and pleasantest of spring-water was to be had by the thirsty for the mere trouble of pumping for it, and as often as not without, for there seemed to be always ready and eager for the work of pumping some small mortal or other close by to pump for you. For the fault of some of these antiquated pumps, they have been either altogether removed or their strong handles are tightly chained to their strong bodies, so that pumping is impossible either to great or to little people. Science stepped in, and reported against them and their doings; and all of them, not those only in bad or suspicious places, were condemned. There was one, for instance, in the Regent's Park, far from impurities, and from which the water was always delightfully clear, and cool and pure to the taste; but it suffered with the rest of them. A not a little curious history would be that of the London pumps; even a list of them would be interesting to see. Some of them have been right down famous. There was and is "Aldgate Pump:" a queer-looking monolithic stone structure it was in times of yore, but it had to make way for Sir William Tite's more architectural structure. But even that improvement, but a year or two back, was doomed to destruction, and now there is another "design," by we know not whom, with a small attempt at a scientific and improved way of holding up a pail or water-can. But the famous pump is still there, luckily. There is another pump not far from it, and it is worth noting, for it is almost hidden among the slaughter-houses, but wherein the water, we are bound to say, is as good and clear as water needs be; and for this simple and plain reason, that the well or source of the water is so far from the surface, where the gas-pipes and drainage abound, that it does not suffer from either of them. Go through some 100 ft. or 200 ft. of sand, gravel, and closely-pressed earth and stones, and almost any amount of impurity is taken away from the water passing through it. It is simply a gigantic filter, and does its work thoroughly and completely, and beyond any power of imitation by any mere human contrivance, as may be sufficiently proved by a comparison between the water from a natural well, and the water as it comes to the Londoner from the scientific apparatus of the water companies. It would be difficult to instance a more useful public work than the "restoration" of a few of the old London pumps, deepening the wells from which they are supplied, so as to be beyond the reach of any contaminating influence. No water is like *spring* water, and from a natural well only is it to be got. There is another curious remnant of Old London water supply in the Strand, the well-known Roman Bath and Well, as it is called. It dates from the days of the Roman occupation, and is, indeed, a natural well of the purest and clearest water. It is a plunge bath, and the water is constantly changing. We will mention but one other of the London pumps, though we could name not a few which have given place to the mean little dribbling drinking-fountains, shut up half the year round, with their little stream of semi-warm bad-tasting water and dirty mouth-pieces. The one we refer to is a right celebrated one,—almost, if not quite, classical. We refer to the one in the Dean's-yard, Westminster. Quite a story might be told of this famous little pump, and its varied fortunes. Two or three years ago it was a most unpretending iron structure, without ornamental details of any sort or kind; but happily for those who lived near it, and for St. Peter's College, and the clerical surroundings, it was always ready with its best of spring water. But alas! consequent on the startling fact of the great railway works then going on at the "Willesden Junction" of the North-Western Railway—and nothing less did it take to upset this sturdy little hydraulic apparatus—it suddenly (who would have thought it?) ran dry, and there was no more water from it, spite of all the pumping. So much did this grieve those who lived near,—and well it might, for it was the only *protected* pump for miles round,—that the non-supply of the water formed the subject of the "prologue" to the Westminster Latin play of that year, and the learned public were informed in good scholastic Latin verse that the scholars sighed for water, and that their pump was dry! But science was not to be beaten; for now, though you cannot draw spring-water, you may pump up common cistern-water from a slate tank sunk some foot or two beneath the ground, supplied as in an ordinary cistern, with the nearest company's water. The learned scholars still call it a well and a pump, though the pump is a superfluity and a sham, and the water *is not spring* water, nor from a well. What a pity it is that the Dean and Chapter do not here, in their snug and comfortable precincts, sink a shaft to a sufficient depth, and bring up from below a real well of pure spring-water, always drinkable, constructing an open marble or stone tank, as well as a pump, if that, indeed, be necessary,—*the water to be visible.* Thus may they set a good example to the rest of London; for what an infinite advantage it would be to have water,—spring-water,—over-flowing, fresh and clear, for the thirsty wayfarer. The common cistern-water, as supplied by the water companies, is hardly drinkable, so that few can avoid the public-house, even if they wished it ever so much. And here we connect the subject with our opening observations.

Notwithstanding the many, many evils resulting as we know from intemperance in this our country, it is not a little to be wondered at, considering the temptations, how very little there is, comparatively speaking, of downright "drunkenness." You may go through on a Saturday night, where everything is favourable, miles on miles of low East-end streets, look into every comfortably-warmed and lighted "house," and see absolutely nothing of the intemperance so often cited. And, at the same time, you would be compelled to ask, Where else are to be found the passing comforts of light, warmth, and drinkables? Not in the open streets, certainly; for in no city in the world are the *streets* so entirely empty of every kind and species of comfort and accommodation. There is, in truth, in this tight little island no *public life*, no open-air and street life, such as there was in the great antique cities of days gone by, or such as is yet to be seen in Oriental cities. John Bull is a home mortal, and it is his weakness as well as his strength that he lives and enjoys himself, after a fashion, in his own house, almost unconscious that there is a street on the other side of his own street-door. But though he knows it not, there is; and there are those who almost literally live in them, night as well as day. It is a curious subject, well worth a little thought and a few words, but not now.

METROPOLITAN TRAMWAYS.

ON Monday last, the joint committee of the members of Lords and Commons met in one of the Lords' committee-rooms, to take evidence for a report on the reference committed to them. This reference, it may be remembered, embraces the points,—whether it is desirable to increase the number of tramways in the metropolis; whether limits should be fixed to the metropolitan tramway area; what such limits should be; under what authority tramways should be constructed and managed; through what streets or thoroughfares additional tramways, if any, should be authorised, and under what restrictions. The committee consists of Earl Beauchamp, the Earl of Longford, the Earl of Airlie, Viscount Eversley, and Lord Clinton; with the following members of the Lower House:—Mr. Sclater-Booth, Sir Ed. Colebrooke, Mr. Arthur Peel (of the Board of Trade), and Messrs. Arthur Guest and James White. Viscount Eversley, late Speaker of the House of Commons, presided, and conducted the proceedings with his characteristic urbanity.

The witnesses examined at the sitting were Messrs. C. Hopkins, engineer, of the London Street Tramways Company; Mr. Rowbotham, manager of the South London Tramways; Mr. Sheldon, who has been extensively engaged in tramway promotion at home and abroad; and Mr. John Morris, of the firm of Ashurst, Morris, & Co. The most important evidence presented to the committee was eloquent and interesting, although silent; it consisted of a very large diagram, showing, in distinctive colours, the tramways in the metropolitan district already constructed and opened, or authorised; the additional lines proposed, with which the promoters intend to persevere in the current session; and the additional lines that have been proposed, that they are ready to give up, if the joint committee, or the private Bill committees to which the projects may be referred, are so minded.

The authorised lines show, as yet, a very partial system of tramway accommodation to the metropolis. They are almost exclusively to the east of a line drawn north and south intersecting

Charing-cross, and afford communication to north, south, north-east, and south-east, on the proposed line, and from Charing-cross as a centre, but do not touch the populous districts to the north-west and south-west, excepting only some lines, inconsiderable in extent, in the neighbourhood of Camden-town, and an irregular triangular communication between Vauxhall and Lambeth Bridges and Victoria Station.

The chief thoroughfares now or to be traversed by the tramway-cars are,—on the south side, running mainly east and west, from Victoria Station across Vauxhall Bridge, *viâ* Kennington, past the Oval, Camberwell, Peckham, Hatcham, New Cross, Deptford, and Greenwich, to Woolwich Arsenal. A loop is formed that passes from Victoria Station, along Lambeth Bridge, and along Lambeth-road to Blackfriars-road, and along that road to the south end at Blackfriars Bridge. At the junction of Lambeth-road and Blackfriars-road another authorised tramway reaches to Westminster Bridge on the Surrey side. It may be here convenient to say that the extensions in this locality that are to be persevered with include a short length to pass along Westminster Bridge and along the Victoria Embankment to the end of Whitehall-place; the promoters being willing to surrender a short length to Whitehall.

Another short length in this locality that they propose to persevere with is a continuation of the tramway communication from Victoria Station to the end of Victoria-street, leaving there a short gap between the point indicated and Westminster Bridge.

Other important extensions to the South of London are from the Strand, along Waterloo Bridge and Waterloo-road, to the junction already referred to, from which the authorised lines will afford continuous communication with Clapham, Brixton, Camberwell, and from Camberwell with all the localities east and west of that point on the original Pimlico and Peckham and Greenwich lines. From New Cross a tramway is already authorised to Westminster Bridge, passing along the Old Kent-road, and past the Elephant and Castle. The additional links, however, requiring to be filled in are from along the Kennington Park-road, past the Elephant and Castle, to the end of B'ackman-street, Borough; and from a junction there a new line continuing the communication into the Old Kent-road. It is not proposed to traverse High-street, Borough by tramway, but it is designed to lay a line from Stamford-street, along Southwark-street, to the London Bridge station. The proposed line to cross London Bridge is also surrendered, and the line along Southwark-road and Southwark Bridge; and the authorised crossings by tramways over Thames bridges, it will thus be seen, are by Vauxhall and Lambeth, and the additional crossings for which powers are to be asked are by Westminster, Waterloo, and Blackfriars Bridges. The proposed surrenders on the Surrey side of the Thames, in addition to those already indicated, are from Battersea Park to Wandsworth-road, and along that road, by Kennington-lane, to Newington, with a fork from Vauxhall Station, along the Thames Embankment to Westminster Bridge.

In the City the chief surrenders are a proposed line from Holborn to Ludgate-circus; a line from Blackfriars Bridge, and along Queen Victoria-street, to the Mansion House, with another from Aldersgate, *viâ* St. Martin's-le-Grand, to the east end of St. Paul's; thence along Cannon-street to King William-street; and the continuation from Moorgate-street, past the Bank of England, and along King William-street, intended to have been continued along London Bridge, is also given up.

Turning now to the tramways proposed or relinquished in the north and west, it would appear that the great area bounded by Paddington, Marylebone-road, Tottenham Court-road, Holborn, and New Bridge-street, Blackfriars, with the Thames for its southern boundary, is, for the present, to be left untraversed by tramways. The lines surrendered in this area include one from Kensington, *viâ* High-street and Knightsbridge, to Hyde Park Corner; and another from Notting-hill, Uxbridge-road, and Oxford-street, to the junction of that street with Tottenham-court-road. It is also proposed to give up proposed lines between Camden-town, by Albany-street, into the Marylebone-road, and two short lengths, one from the Marble Arch along part of Edgware-road, the other from Praed-street into the Uxbridge-road.

The new lines in the north and north-west, for which powers are to be asked, are very important, and include,—Holborn, Oxford-street (as far as Tottenham-court-road), Tottenham-court-road, Harrow-road, Edgware-road, Finchley-road, Caledonian-road, and King's-cross-road; with a connexion east and west between Islington and Bayswater, by the Pentonville, Euston, and Marylebone roads. The proposed lines are intended to join up numerous defective links in the metropolitan tramway system, and provide continuous tramway communication from Upper Holloway on the north to Camberwell, Brixton, Clapham, and numerous other localities in the south, with "correspondence" lines radiating in almost all directions, excepting to the west.

The Committee, at its rising, adjourned to Friday, the 19th instant.

HINDRANCES TO THE PROGRESS OF APPLIED ART.

In the course of a paper under this title read at the Society of Arts, Dr. Dresser said:—One of the chief hindrances to the advancement of decorative art is to be found in designers themselves, for there are many pattern-drawers who are a disgrace to the profession, inasmuch as the works which they produce manifest only gross ignorance, and are, therefore, altogether unworthy of notice. Of these I will not speak, but I desire that they should understand that whatever is produced which is of debasing character tends to the extermination of decorative art, for who would not prefer a plain article to one covered with graceless forms and inharmonious colours?

Passing from these men, to whom the name of "artist" cannot be applied, to those designers who have a certain amount of art-ability, we notice that the works produced by these latter are often inconvenient to use while they are beautiful in form, and are thus of a character calculated to bring art into disrepute. An art object should be useful as well as beautiful, if it is intended to fulfil a utilitarian purpose; yet not one poker out of a hundred is so formed that it can be used with comfort, nor is one tea-pot out of fifty so made that it will admit of the tea being poured from it without an expenditure of force greater than is necessary in order to the support of the weight which has to be lifted. By leverage a pound may balance a hundredweight, as in the steel-yard; so in the case of a tea-pot, by leverage that which weighs four pounds may be as heavy to lift as that which weighs eight. Although the law which regulates the placing of handle and spout on all vessels from which liquids are poured is thoroughly understood, yet it does not appear to be known to one designer in a hundred, judging from the vessels which we see offered for sale in our shops. In like manner, pokers have become so inconvenient to use that it is impossible to break coal or even poke the fire with one without hurting the hand; hence, ladies have begun to regard fire-irons as mere ornaments, and to keep a little second poker and tongs for *use*, which latter are hidden in some corner, as objects unfit to be seen. There is nothing which tends to retard the progress of applied art more than the production by designers of objects which are inconvenient to use; and be assured that the most perfect beauty may be combined with the most complete utility; in other words, that which is most beautiful may be perfectly useful. How is it, I ask, that designers will not inform themselves upon subjects which, to them, are all-important, and without a knowledge of which they cannot produce acceptable works? I am often amazed at the ignorance of my fellow ornamentists upon subjects which they ought perfectly to understand; and yet many of these men can draw well, and combine forms in a truly artistic manner, but their works, through not being adapted to answer the end of their creation, only tend to bring the beautiful into disrepute, by leading persons to suppose that if a work is graceful and lovable it cannot be used with comfort.

Our worst enemies are those of our own household; so, in like manner, the worst enemies to the progress of applied art are ignorant designers. If we, as designers, will but educate ourselves, we shall thereby remove one of the chief hindrances that impede the progress of applied art.

It is a strange thing that to this hour the great majority of the designers, or pattern-drawers, employed in our manufactories are men almost wholly without education, and chiefly from comparatively low life. The son of a weaver in a carpet-works or lace-factory, if he manifests any taste for drawing, is put in the designing-room and is trained to draw patterns; but as he is placed there at the age of from ten to twelve years, and is the son of parents who could not afford to have him educated beyond being taught to read and write, he has but little knowledge when he commences his art-training; and as, in the great majority of designing-rooms, he never sees a work on ornament, nor a good example of true art-work, he gains simply a technical knowledge of the manufacture, and acquires no insight into the character of true art. A man cannot help his origin, neither is he to be despised for being the child of poor parents; but if he remains in ignorance he cannot be expected to produce noble works, nor to exalt the manufacture which he strives to adorn with forms and colours. While a man is not to be blamed for being born of poor parents, he is open to censure if he does not strive to gain whatever knowledge is placed within his reach. Nearly every town in the kingdom has now its drawing-school, where a certain amount of art-knowledge may be gained, and connected with these schools there are frequently art-libraries. That youth who is worthy to be called an art-student will avail himself of whatever means are open to him, and even if he be employed for long hours in the factory, he will strive by reading, sketching, and, beyond all things, by thinking, and by the study of nature, to gain such knowledge as will lead him to draw patterns such as will please persons of education, by revealing to them the fact that he who addresses himself to them through the agency of form and colour is also a man of education.

If it is any consolation to you, my fellow-students of applied art, let me say that I, with you, have felt the want of education, and have known the poverty of small means, but by foregoing for a time the pleasures which others enjoyed, and by continued close application to the study of our beloved art, I gained the victory over that poverty, and that utter want of education under which I for a time suffered; and now I can say that I sit at the tables of rich men, and that men of learning honour my table with their presence. I would not for a moment say what I do were it not for the thought that these words may encourage some poor student to work on till he rises through his poverty to that position in which he can present his works fairly before our notice, and charm us with his knowledge.

Certain manufacturers may truly be regarded as hindrances to art progress. Some men are honourable, others are dishonourable; some men are noble, others are ignoble; some men are pioneers of progress, others retard all onward movements. It is curious that there are many men who would not rob another of a farthing, and yet who eagerly look for every new pattern which more honourable manufacturers than themselves produce, with the view of copying them if they be good and are not protected by registration, or of producing others as nearly like them as they can if they be registered. Such men I regard as not only hindrances to the progress of art (for who likes paying a high price for a well-considered design if immediately it is issued others copy the idea, if not the actual design, and by saving the cost of the pattern are enabled to undersell the original producer?), but as nothing more nor less than thieves, who should be engaged on the treadwheel with others of their kind. This detestable piracy of new patterns, which is constantly carried on by those who are truly little men, is one of the great hindrances to art progress. Did it ever strike these detestable rogues, I wonder, that by every piracy they commit they not only degrade themselves but exalt both the manufacturer and the designer of the pattern which is stolen? The very theft acknowledges the want of power to produce what is of equal merit. To those noble men who continue to produce what is new and what is beautiful, while they constantly suffer from theft, I would say,—Persevere, for the tribute which the mean pay to your nobleness and enterprise is sufficient in itself to build up in time your worthy reputation.

Much has been said respecting the unwillingness of manufacturers to issue designs of an art character, and to pay such prices for patterns as will fairly compensate the designer for producing a carefully-considered work. I have had as much to do with manufacturers, I think, as most artists, and perhaps more, and I am bound to say that I have found most of them both willing to try new things and to pay handsomely for well-considered designs; but as the object of

business is, in a sense, money-making, the manufacturer cannot be expected to produce many patterns such as will not sell when placed on the manufactured article. Some men I could name who nobly contribute towards the education of the people by yearly producing a few works in good art which do not command a large sale, owing to their being too advanced for the public taste; but these men are few in number, yet they do exist amongst us. However, with the exception of a few mean hounds, such as we find in every class of society, I exonerate manufacturers from the charge of being hindrances to the progress of a true decorative art.

The public, in some instances, impedes the progress of art. The public is of two classes,—the educated and the uneducated. The educated, in many instances, seek better art than is to be found on the goods procurable at most of our shops; but the utterly ignorant, having no art knowledge, are pleased with whatever is "loud" and showy. These latter undoubtedly hinder the progress of art, as some manufacturers will cater for the patronage of the most vulgar; but this hindrance will disappear with the increase of art knowledge.

Whatever is bad in art tends to vitiate taste. If a person whose taste is highly cultivated, and who is sensitive to every deformity both in colour and form, is obliged to contemplate what is ugly, he, after a time ceases to feel the hideousness of what he views; thus, if he takes lodgings by the sea-side, and the walls of the room in which he sits are covered by a hideous paper, and the floor by an obtrusive carpet, and if every piece of furniture is uncomely, and every so-called ornament in the room a mere offence to good taste, however repulsive all this may be when first seen, it will become less and less offensive as he dwells upon it, until finally it ceases to impress the sense as that which is uncomely at all; and in order that its true nature be understood the judgment has to be appealed to: thus the sense which leads us to discriminate between the beautiful and the uncomely becomes deadened. This leads us to perceive the necessity for surrounding ourselves with beautiful objects, if we would keep alive within us a quick perception of the beautiful, and to see that whatever is presented before us which is beautiful tends to exalt our taste and sharpen our perception of the beautiful. But we also perceive that whatever around us is not excellent tends to degrade our taste and to deaden our perception of the refined and graceful. This brings me to consider the effect which museum objects have upon the taste of the country.

The Chairman (Sir Digby Wyatt), at the close of a discussion which followed the reading of the paper, said success in certain technical directions was of the utmost consequence, and, to a great extent, the museums which had been most useful in foreign countries in instructing the workmen, were those in which elegance of design was the first consideration, and the illustration of the historical arts of the country the second. He was far from desiring to see an academy for applied design in one place, and one for imitative design in another. The proper thing would be to amalgamate the two, and make one great central institute, and then some good might be done. He should like to see more attention paid to applied art in the Royal Academy, and considered it a disgrace that Mr. Owen Jones was not an associate of it. With regard to schools, it must be remembered that the first essential was to teach a person to see with his eyes, and to work or imitate with his hands,—to make those two organs so tractable that the student might, in the first place, so distinguish tints as to imitate colours accurately. Until he had learned the whole gamut of colour he could not produce a pattern or design, however clever he might be. The reason why, as Dr. Dresser had said, students from South Kensington were not found to be of much use in designing-rooms in manufactories was, that the student becoming learned, imitative art went where it was not required. A manufacturer might send for a student, thinking he would be a treasure, and find when he came that he could not design the branch of manufacture which he wanted, though no doubt he could do something else very well. In truth, he wanted that practical element in education which should really be the life's labour of every man. The common error with regard to education was to suppose that, having been taught up to the age of twenty, we are then to cease learning, and only practise what we know. Education was then in reality only beginning. When a student had been thoroughly taught form and colour, and was then set to master the practical requirements which he had to meet, he would become a much more valuable artist than one who had been simply dragged up, step by step, in the manufacturer's designing-room. Elementary knowledge and correct principles should be taught in schools, but the same results must not be expected from a youth as from a man with life-long experience.

LIVERPOOL WATER-COLOUR SOCIETY.

THIS society, at present, we believe, the only water-colour society in the provinces, has been formed with the laudable object of promoting and extending the taste for this branch of art in Liverpool and the neighbourhood. The promoters are chiefly local artists, and the Inaugural Exhibition was opened on the 15th inst. The collection numbers somewhat over 200 drawings, among which are included contributions from eminent English water-colour artists,—Branwhite, Newton, Absolon, J. M. Jopling, and others; most of whom figure in the catalogue as "honorary members." With the exception of these works with well-known names (and they are not very numerous), the standard of merit is not high. Mr. R. T. Pritchett, a non-resident member, is an extensive contributor of drawings, all showing more or less ability, of which a little "Sunset on Esher Heath" is the best. Among local names challenging attention are those of Messrs. Bond, Norbury, and Sullivan; the works of the last-named being, however, more ambitious than successful. Mr. Clark Stanton, of Edinburgh (a name not familiar to us), contributes, among other things, a slightly finished drawing under the title "A Rest by the Way," a young lady resting on a bank by the roadside, which indicates, in colour and general treatment, no ordinary degree of refinement and artistic feeling.

While welcoming with pleasure all signs of a revival of art-interest in an important town where it has long been dormant, we cannot but regret the want of judgment shown in regard to the work admitted into this first exhibition of a new Society. A considerable proportion of the drawings hung are poor and commonplace to the last degree; some are so ludicrously bad that they can only have been hung with a view to cover the walls. This is not the way to advance art. Better confine an exhibition to fifty drawings, and have those good, than cover the walls with productions which can only have a deteriorating influence (if any) on public taste. We hope the Society will manage these things better in future.

FALL OF IRON ROOF, SARATOGA SPRINGS, U.S.

SOME short time ago the roof of the new passenger depôt at Saratoga Springs fell.

The roof was arched, of 30 ft. span, and made of corrugated iron, with wrought-iron tie-rods, five-eighths of an inch in diameter, and was supported by round columns, 4 in. diameter, 15 ft. distant from centres. On the inside of each column, about 5 ft. distant down from its top, was attached one end of a wrought-iron tie-rod, supporting the roof; and on the opposite side was a bracket, extending out 10 ft., whose bottom exerted a diagonal transverse strain in the same direction as the tie-rod. These brackets supported a roof, forming a shed over the gangway beyond the arched roof, making, with the 30 ft. span of roof, an entire width of 50 ft. Mr. P. H. Jackson, inspector of iron construction, New York, writes,—

I have been induced to go into a calculation of the strains on the weakest part of this mantrap, namely, the columns and tie-rods.

The weight of snow and ice upon the roof, in accordance with the leading authorities, is considered at 40 lb. per superficial foot as a maximum load in our climate. On the day of the falling of this structure, there had been a light fall of snow, and the ground was frozen. I question if the weight on the roof at the time exceeded 20 lb. per foot, as snow is ordinarily light. What causes it to become heavy is a subsequent fall of rain, then freezing, and snow again. Forty pounds per foot is considered a maximum load under the most unfavourable circumstances.

The column was 4 in. in diameter, and, say, 1 in. in thickness, and about 18 ft. long. Its proportion of vertical pressure would be the weight coming upon half the roof of 30 ft. by 15 ft. distance from centre to centre of columns. Taking the weight of roof alone, exclusive of any contingent weight, at 12 lb. per foot, we have 52 lb. per foot for the weight of roof and load upon it.

* * * *

The following is a summary of the strains on the column:—

Vertical pressure, weight of roof, 6·15 net tons; unnecessary transverse strain of tie to break the column across, 11 net tons; diagonal transverse strain at the bottom of the bracket, in the same direction as that exerted by the tie, $2\frac{3}{4}$ net tons.

Taking these spindle columns, whose dimensions are about suitable for a summer-house or verandah, at a safe weight of one-fifth the breaking weight, when subject to a vertical load, and then only when the ends are at planes with their axes, we have the safe weight at $8\frac{8}{10}$ tons. Nothing less than one-fifth the breaking weight will do, as at one-fourth the breaking weight it was found, by experiment, that incipient crushing took place. This safe weight allows nothing for a lateral blow caused by merchandise falling, in transmission, against the column. For a column where transverse strain is to be exerted, calculation should be made in accordance with the formula for strength of beams, as well as that for the columns.

In regard to the tie-rods, they were not nearly up to the standard required for safety; a $\frac{5}{8}$-in. round rod is equal to about 3-10ths square inch of cross section. The working strain should not exceed the limit of its elasticity, which is about 8 tons per square inch. The Board of Trade of Great Britain permits, as a maximum working strain, but 5 gross tons per square inch of cross section. In this case, the tie-rods should have been at least $1\frac{1}{2}$ in. in diameter to resist the thrust of the arch; and the columns 7 in. in diameter, and 1 in. thick, providing the tie-rod was not attached to it.

"UNDERGROUND JERUSALEM."

MR. WILLIAM SIMPSON, who has made himself known by many illustrations produced under difficulties, and especially by his pictures of India, Cashmere, and Russia, which he visited on the occasion of the marriage of the Princess Dagmar, has plunged into the cisterns, vaults, and drains opened by Captain Warren in Jerusalem, and has recorded, with faithful, and in most cases effective, brush, all that was to be seen. Many of these excavations have since been filled up again, thus making the drawings additionally valuable.

The Church of the Sisters of Zion, of which he gives a view, although not underground now, was so until very lately. The arch behind the altar was recently laid bare, and this is the first drawing of it since. One side of this church is formed by a wall of rock cut in past times; and underneath the convent are two tunnels, one of which is represented in the collection. They are of some importance, as bearing on the water supply of the Temple. The Tomb of Joseph of Arimathea, almost unknown, is given. The entrance to the Royal Quarries was only discovered a few years ago, and may be said to be entirely new as a subject for pictures.

The drawings are on view at 48, Pall-mall, and will reward a visit.

At the next meeting of the Society of Biblical Archæology, Mr. Simpson is to read a paper on "Underground Jerusalem, more particularly the Plateau of the Haram es Shereef," when some interesting information will probably be added by members of that society.

HOSTILE OCCUPATION OF REGENT-STREET.

THE demon that presides over the local government of London seems to delight, not in evolving order out of chaos, but in blending the elements of order in inextricable confusion. The London season being at its height, the time has naturally been selected for the occupation of Regent-street by a hostile force of "navvies." We pause to describe the scene, now under our eyes. Trestles are placed in the very centre of the roadway; veritable barricades they prove, whatever might be their fate at Paris. Under shelter of this *tête-de-pont*, a small gang of sturdy labourers proceeds to break up the surface of the road with pick-axes. New stones,

rudely broken into blocks of some eight to ten cubic inches each, are laid in a thick stratum along part of the street. Close by this stratum of destruction to horse and to carriage, one or two of the biggest "navvies" are, as we write, coolly scattering shovelfuls of stones that have once formed part of the "metal," scattering them with that peculiar sweep and fling of the arm by which the obnoxious missiles can be spread over the widest surface, and all thus rendered at once most useless and most dangerous. A horse-roller is at hand,—as if to make the mockery of the patient public more keen. After pausing to watch the whole process for some time, we came to the conclusion that it would be difficult to suggest any alteration of plan that could increase its danger, its costly wastefulness, or its cool insult to the public; or that could render the work of the road surveyor at once more inefficient and more expensive.

Where are the officers of the Society for Prevention of Cruelty to Animals? No owner of a fine horse can now ride or drive without imminent danger of laming the animal. No carriage can go along this main West-end thoroughfare without having at least a month's durability shaken out of its future existence. It is difficult to account for the procedure. Is it done with the idea, like regulations made in the time of James I., of keeping strangers out of London? Unless the most unfit time *must* be selected for re-metalling Regent-street, the operation could and should be effected between the hours of midnight and six in the morning, by an adequate force of men, who should strip, cover, and properly level a portion of the street at a time; consolidate it by the steam roller, leaving it perfectly fit for traffic; and disappear, like good people, before the London cockcrow.

THE PENTATEUCH.

A COMMITTEE of Rabbis and doctors, at the request of the Society of Biblical Archæology, have met at the Soane Museum, to examine the sacred roll of the Pentateuch sent over from Aden by Lieut. Prideaux, and presented by him to the Society. Rabbi Hermann Adler; Rabbi and Professor Marks; Rabbi Schiller Szinessy; the Rev. George Small; Rev. Dr. Currey, Master of the Charterhouse; Iltudus T. Prichard; S. M. Drach; Joseph Bonomi, Curator of the Museum; and W. R. Cooper, Secretary of the Society, were present; and Professor Donaldson, Ph.D., as Secretary for Foreign Correspondence, and one of the trustees of the Soane Museum, was in the chair. The examination was very minute, and occupied a considerable time; and with the intelligent explanations of the Cambridge Professor of Hebrew, and the other Rabbis, brought to light many important peculiarities. The most ancient part dates from the tenth century. A full report will be read at the meeting of the Society on the 7th of May.

THE TRADES MOVEMENT.

Cambridge.—A deputation appointed by the building operatives has been received by the representatives of the Builders' Association. The chair was occupied by Mr. Bell; the other members of the Builders' Association being Messrs. A. Gray, T. Bradwell, Thoday, Kett, jun. (secretary), and Tompkins. The deputation from the building operatives consisted of Messrs. F. Bowick, J. H. Cooke, W. Cooke, Hyson, Loenes, W. Scott, and R. Riddle (secretary). The deputation said they wished to know whether the masters would accede to fifty-four hours, so as to employ the men summer and winter. They also wanted an increase of wage of 6d. a day. The average wages of the men in Cambridge were 24s. In other places, the men were receiving as much as 27s., 28s., 29s., and 30s. One of the deputation said that (as a labourer) he was receiving 15s., out of which he had to pay 9s. 4d. per week for bread and flour, 2s. 2d. per week for rent, and 1s. 2d. for 1 cwt. of coal; and he had eight mouths to feed. Some of the deputation complained that they were unable sufficiently to support themselves on their wages. Others wished for more time for recreation or amusement. On the part of the masters, it was remarked by the Chairman and Mr. Gray that the employers were perfectly willing to make an alteration if it could be done satisfactorily. They denied, however, that Cambridge was paying less than other places; on the contrary, the chairman produced evidence to show that the wages were quite as high as in Huntingdon, St. Neot's, Diss, Bury St. Edmund's, Ely, Lynn, Norwich, or, in fact, anywhere in the Eastern or surrounding counties. After a long and desultory discussion, in which various points *pro* and *con.* were argued, the chairman said the matter would be laid before the Builders' Association, and the result duly reported to the operatives.

Sittingbourne.—About 100 brickmakers at Sittingbourne were engaged at 3s. 6d. per thousand, and lately the masters gave an advance of a penny. The gangs demanded 2d. more, which the masters conceded conditionally on the market remaining at its present height, and the men leaving 6d. in hand as "pence-money." This was refused, and the men have struck.

Dumfries.—The masons in the employment of Messrs. John Edgar & Son, Dumfries, have struck work. It appears that the firm had employed two plasterers, to point the interstices in the freestone courses in a range of dwellings they had contracted to erect. To employ plasterers at such work has hitherto been a common practice; but a meeting of the trade-union was held, at which it was resolved, that unless the plasterers were dismissed, Messrs. Edgar's workmen were to strike, and a deputation was appointed to wait on their employers. At breakfast-time next day the deputation saw Mr. Edgar, sen., who, on being told the object of the deputation, said that he had engaged the plasterers for the job, and was determined they should finish it, whether there was a strike or not, upon which the whole of the workmen left, but did not remove their tools.

Hawick.—Some time ago the journeymen connected with the building trades in Hawick,—masons, joiners, and plasterers, resolved to ask for the adoption of the fifty-one hours system, with an advance of ½d. per hour on wages, from the 8th of April. The present rates are,—masons, 6d.; joiners, 5½d. per hour; and plasterers, 24s. per week. The master masons declined compliance with any of their demands, and no further action has followed. The master plasterers agreed to give 5½d. per hour, and left it to the option of the men to work either nine or ten hours daily, after the 8th of April. The operative joiners have refused the offer of the masters to advance wages ¼d. per hour, and another farthing on the 1st of June, with the option of working nine or ten hours, and resolved to stand out for their full demand of ½d. per hour advance. As the employers declined to concede these terms, a number of the men, but not all, struck work.

THE COVERED MARKET, PRESTON.

THE Preston Covered Market question, to which we have already alluded, is, we regret to say, far from being settled. The new contractors, Messrs. Bennett & Co., of West Bromwich, engineers of good repute, have refused to proceed with the work, on the ground of radical defects in the design, which they allege preclude the possibility of a safe structure being erected from Mr. Garlick's plans. The Messrs. Bennett say that having investigated the principles of construction of the proposed roof of the Covered Market, they have discovered that "it is utterly impracticable to construct, with safety, a roof in accordance with the details shown on the plans;" and they speak of "certain fatal defects in the structure that render the safe construction of the roof impossible." The Markets Committee, as we have already mentioned, resolved to call upon Messrs. Bennett to execute their contract, and the Council has now confirmed the resolution of the committee. The contractors urge the Council to refer the plans to some disinterested engineer of high standing.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

ON the 6th inst., the members and friends of this Society paid a visit to the works of the Native Guano Company (by permission of the directors), situated within the grounds of the Crossness Pumping-station of the Southern Main Drainage system.

The system of sewage conversion about to be tried is that known as the "A B C" process, and will soon be in full operation, it having already been experimentally tried here on a small scale. The *modus operandi* was fully explained to the members, and some samples of sewage were treated for their information. After fully inspecting all the works, they were shown some samples of dried sewage, which when ground is sold as manure (native guano), and was said to be much sought for by farmers who had once tried it. The members then, by permission of Mr. Bazalgette, visited the engine-house and works of the Crossness pumping-station, where the four engines required to pump the sewage up into the reservoirs were examined and explained to them. These engines caused much interest on account of their great size and power. Two are continually kept working, each making six strokes per minute, and pumping 2,000 gallons at each stroke. The other two are kept as reserve engines, in case of a storm occurring in the London district, in which case the united power of all four engines, pumping 48,000 gallons per minute, is not more than sufficient to keep under the storm-water pouring down.

SCHOOL BOARDS.

Ipswich.—At a meeting of this Board the clerk stated that, in accordance with the directions of the Board, he had written a letter to the Education Department, the reply to which says,—

"There should be sufficient space in the general room and class-room together to accommodate all the children. If the general room is of itself large enough to accommodate all, and is then sub-divided into class-rooms, it will not be necessary to provide additional class-rooms; but if the general room is not large enough, and the accommodation should be calculated at nearly ten superficial feet per child, then it will be necessary to furnish class-room for the deficiency.

Supposing that the aggregate area is about 10 ft. per child, it will be sufficient if, in the general room, accommodation is provided at the rate of 4 ft. per child for the whole number of children provided in the school and class room.

There should be not less than two class-rooms for each school: each class-room should be about 20·0 by 16·0.

In reply to your final inquiry, I am directed to state that an additional class-room allowed to a drawing-class may be used alternately by boys and girls, provided it is so placed as to be conveniently accessible for each school."

Some conversation then took place with reference to the kind of division the Education Department would require between class-rooms in a large school-room divisible into class-rooms.

Aberystwyth.—The following architects were a short time ago invited to send competitive designs for the new schools at Aberystwyth, providing accommodation for 600 children:—Mr. J. P. Seddon, Messrs. George Jones & Son, Mr. R. Owens, Mr. Sherwin, and Messrs. Szlumper & Aldwinckle. The Board have selected the designs submitted by the last-named gentlemen, and the buildings will be commenced at once.

Great Driffield.—Mr. H. J. Paull has been appointed architect to the School Board of Great Driffield, in the East Riding of Yorkshire. A block of school buildings is to be erected forthwith for 700 children, on a site on the Bridlington-road, in the outskirts of the town. The same gentleman holds the appointment of architect to the Hope School Board, near Wrexham, and plans are passed and tendered for to accommodate 600 children for that Board in two blocks of buildings, viz., 250 at Ffrith, and 350 at Hope.

ARBITRATION IN THE BUILDING TRADE.

MR. RUPERT KETTLE has been sitting in Birmingham as arbitrator over a conference of masters and representatives of working men in the building trade. The carpenters, labourers, and plasterers were represented. Notice had been given by the men, under the rules agreed upon in 1867, for a reduction of the hours of work to 50½ per week. After the conference had lasted some hours, the employers proposed that the hours should be fixed at 54. On the other side, a proposition was made that the hours should be 53. On this difference there was a split, all the masters' representatives voting on the one side, and all the men's representatives on the other. The matter was left to the decision of Mr. Kettle, who, in giving his award on the general question of time, said:—

"In deciding this question, I have not only to consider the desires of the parties in contention before me, but the combined interest of both, so as not to disturb their trade, and check the desire for building. I have come to the conclusion that, although from what has happened in this town and elsewhere, customers may be disposed to accept the result of what is called the nine-hours movement, they could not at present willingly enter into bargains based on still shorter hours. I therefore, as much in the interest of workmen as of the employers, decide that an average of nine hours a day,—that is, fifty-four hours,—be the working week. This does not apply to the three winter months."

The deputations then made a vain effort to arrange the hours for beginning and leaving off work. These deputations then withdrew, leaving the question in dispute to be settled by each branch for itself. The plasterers' deputation next took their place at the table, and the question which had just been debated by their predecessors was again discussed. The time for beginning and leaving off work could not be agreed upon, and the Umpire said he would prefer not to decide that question by itself, but to take the whole case together. The question of wages was then discussed. The present rate of wages in the plasterers' trade is 6½d. per hour, and the men's demand was for 7½d. Mr. Briggs made an offer on the part of the employers of a rise per hour equivalent to the reduction of time, namely, a farthing per hour. The Umpire observed that it was five years since there had been a rise of wages in this trade in Birmingham, and that was a long time, as things were going now. He would ask the representative of the employers to consider whether their proposal to give a rise equivalent to the reduction of time was equal to the increase of wages which the nine-hours settlement had practically amounted to in other trades and other places. After some discussion and a short adjournment, Mr. Holmes proposed that the payment should be 7d. per hour, as a settlement for two years. This proposition was seconded and discussed without result, and the Board proceeded to consider the question of overtime, but no conclusion was arrived at. It was agreed that 2s. should be allowed for lodging-money on out-town jobs, and that payment of railway-fare should be left for arrangement between the parties. The Court shortly afterwards adjourned.

HEIGHTS OF BUILDINGS AND ANGLES.

A "LEVEL AND ANGLE INDICATOR" has been brought out by Messrs. Fletcher & Sinclair, of Liverpool, including, in a compact case, a compass and sun dial. It is described by the inventors as being a simple form of theodolite, there being a sight hole and horizontal wire at the base, and its price is within the means of most mechanics. It strikes us that the instrument will need great practice before it can be used with anything approaching accuracy, and then it must of necessity be placed on some steady support. All who use the theodolite know the care and the anxiety required to sight and adjust the instrument by means of finely-cut screws, and standing on a stiff stand. The Angle Indicator may be of service for taking approximate angles in the case of those who will master it.

NEWGATE AND THE SESSIONS-HOUSE.

HAVING read in your paper that the Mid-London Railway Company have purchased the Christ-Church or Blue-coat School buildings, with four acres of land, for 600,000*l.*, the governors of the school intending to erect schools in different quarters of London, and one in the country for 1,000 scholars, it appears that land in the locality of Newgate-street must be of enormous value; and an excellent opportunity offers itself for the pulling down of that melancholy building called Newgate and the adjoining Sessions-house, disposing of the sites, and with the proceeds erecting a new gaol and sessions-house on the confines of the county of Middlesex.

It has always occurred to me that it was unjust that the county of Middlesex should have the odium and expense of finding a sessions-house and a gaol, for the trial of the offenders (in addition to their own) for the counties of Surrey, Essex, and Kent, according to a certain radius from the centre of London, which the Act establishing the Central Criminal Court has enacted; for it gives the world an exaggerated idea of the state of crime of the county of Middlesex, although, no doubt, the present position of the Central Criminal Court is very convenient for the barristers who have chambers in the Temple, Lincoln's Inn, and Gray's Inn, to attend; but in consequence of the facilities for travelling now offered by the railways, it is no longer necessary for gaols to be fixed in the heart of populous cities.

The surroundings of the melancholy Old Bailey are very different at the present time from what they were twenty years since. It had not then the terminus of the London, Chatham, and Dover Railway on Ludgate-hill, the Metropolitan Railway terminus in Farringdon-street, and the forthcoming Mid-London Railway Terminus, in Newgate-street. Let the citizens take into consideration the changes time has made in their City, and what a great improvement would be effected by the pulling down of Newgate Gaol and the Sessions-house, and making a communication from Farringdon-street, crossing the Old Bailey to Paternoster-row, leading to Cheapside, which every one must consider a great and necessary improvement, and one that could be made, from the high price of land in the locality, profitable to the City of London.

I have abstained from suggesting on what part of Middlesex the new gaol of Newgate and the Sessions-house should be built. Middlesex is a large county, and a suitable spot could be selected, with railway facilities; so that, as county gaols are now conducted, only the smallest amount of inconvenience to the particular neighbourhood would be experienced.

MARCO.

THE RAILWAY BRIDGE IN LUDGATE-HILL.

WHY must this be always called "the ugly bridge," as, for instance, by "J. B.," at p. 274 of the *Builder* for April 6th, in introducing his novel suggestion? The bad habit of sticking on handles, used as certainly as any "Lord" or "Sir," grows upon people sadly:—

> "In all debates where critics bear a part,
> No one but nods, and talks of Jonson's art,
> Of Shakspeare's nature, and of Cowley's wit," &c.

Yet even when you can call a man "the judicious Hooker," or "the vivid Froude;" or a building "the majestic St. Paul's," or "the elegant Travellers' Club," it is well at times to treat the reader to an omission of the appellation, sanctioned though it may be by usage. Further, "ugly," in its usual sense of "offensive," "deformed," "of very disagreeable aspect," seems not quite happy in this case. The bridge has of course marred the aspect of the street and of the neighbourhood: the railway so near upon the thoroughfare has all the effect of a Temple-bar of an extremely determined kind on the view up the hill, and in descending absolutely destroys the perspective. The proportion of height to width,—the headway being so small and the street fairly wide,—has never been pleasing in an opening of any kind. The necessity of making use of every inch of height has not allowed any show of constructive purpose in the soffit; the beams and filling-in have been kept rigorously to the same level.

It is from this pretty clear that, on general grounds, the bridge ought never to have existed; a remark that might be made of lots of other triumphs of science, did not one recognise the wisdom of silence in the face of imperious destiny (at any rate, the level of the line should have been at least 15 ft. higher). The greatest efforts and skill would be as likely to be productive of *perfect* grace or dignity, as they would be in a dance by an artist bound for the rope-trick, or in a State reception by a princess under the conditions that struck Apollodorus as uncomfortable for goddesses in Hadrian's Temple of Venus and Rome. But, the conditions taken for granted, the treatment of the bridge with bracketed sides may be pronounced ingenious and not ineffective; the open-work parapets introduce a satisfactory variety, and the design and execution of the ornamentation are certainly not contemptible. Of course no one would expect the iron images of the City wild beasts,—rampant after their manner,—to be more beautiful than is their wont.

All this amounts to wishing that buildings (and other things) shall be praised or blamed for their obvious and acknowledged defects, and not by rote or by epithets that are at best misfits.

The fountains in Trafalgar-squre are good standing instances of the force of habit,—being almost invariably described as "the ugly fountains." Mr. Helps has furnished what will be taken by the diligent antiquaries of posterity as the opinion of our own time about them: yet I doubt whether many people who have made a real examination would eagerly maintain its correctness. The fountains may be too small, the parts of the square may be out of scale (the Nelson column would ruin any *place* on this head), the water may be a little scanty, and may have been still scantier when they were christened; the reservoirs may have contained dirty water and have leaked enough to make their surroundings sloppier than lovers of monumental architecture looked for. But this ought not to have led men well out of the blues to denounce the artistic design of the fountains themselves.

Without indulging in all Mr. Walter Shandy's enthusiasm, perhaps one may be allowed to interpose so much on "that mysterious influence of naming which determines so much of mortal choice," inasmuch as often "the right word is a power and communicates its definiteness to our actions." (G. Eliot, Middlemarch, book iii.)

S. F. C.

MERCY FOR MASONS.

THE bright sun has at last taken its place with a promise to last, bringing comfort to many. The exceptions I wish to name are the masons, whom you see working in the open with the full glare of the sun upon the white stone at which they labour, with the result, as one expressed himself, that when he "turned his head aside he could see nothing." And naturally so, the glare affecting the eyes. Why do they not work in the shade when possible? If not possible, why do they not wear coloured glasses, and so preserve the eyesight for future years? I should like to know the average of injured eyesights among masons in comparison with other trades. A light respirator also, I should imagine, could be contrived to preserve their lungs, which would lessen the number of deaths from consumption and asthma considerably. If a few were to start such appliances, and prove the beneficial results, rest assured the many would not be backward in resorting to a present remedy for the prevention of a future injury.

Y.

ADULT INDUSTRIAL SOCIETIES.

SIR,—May I be permitted to call attention, through your columns, to a section of the working community who, however willing to earn an honest livelihood, are unable to do so from the fact of their being brought up to an industry which has been superseded by the introduction of machinery, or which they cannot follow profitably from accident having deprived them of the means of so doing.

Some years ago a lady, well known for her deeds of practical charity, assisted those of her own sex who suffered from a similar cause. Will any gentleman come forward and help to provide an institution where men of *good character* may learn a new calling, earn enough to keep their homes together, and get together a few tools, if required, till proficient enough in their new form of work to be able to earn a decent living, and become more useful members of the community?

Boys in our reformatories, and convicts in our gaols, are taught some useful craft, to enable them to live honestly, if so minded. Give *honest* men, who equally deserve our care, the same chance of preventing themselves or their children drifting into such poverty as would tempt them to despair, to intemperance, and to crime.

J. J. A.

THE WESTWOOD TOMB, LITTLE HORKSLEY, COLCHESTER.

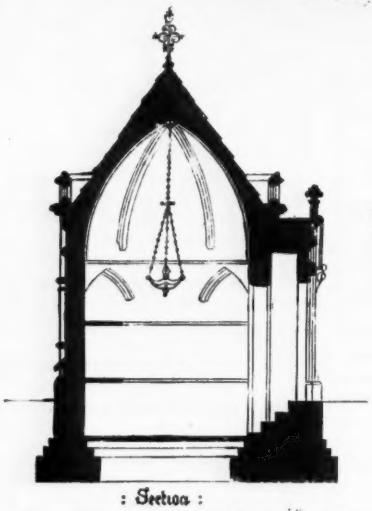
THE building of which we give an illustration in our present number has recently been erected as a family mausoleum for Mr. Wm. Macandrew, J.P., of Westwood House, Colchester.

The octagon form adopted by the architects is based upon a simple quadrangle, so as to cover the actual ground at their disposal, having sufficient depth for a lower story, and carrying two ranges of shelving round the space at equal heights, the upper portion being broken up into an octagon, carrying an upper range of shelves, and the whole space being covered with stone vaulting, having moulded ribs at intersections. The floor is laid with encaustic tiles, with a monogram in the centre.

Externally, the Decorated style is adopted. The whole of the work was contracted for by Mr. McColla, of Victoria-street, Westminster, and all the art finishings were supplied by London workmen.

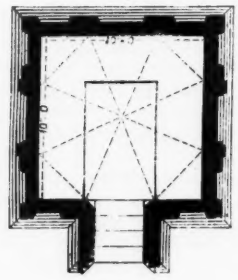
The stone used throughout was obtained from the Conflans quarry in France. The masonry and carving were executed by Birtchnell, of Clapham. The slate shelving was from Magnus, of Pimlico. The iron doors and fittings were supplied by Hobbs, Hart, & Co.; and the ornamental ironwork is from Hart, Peard, & Co.

The total cost was 600*l.*; and the works have been carried out under the direction of Messrs. W. G. Habershon & Pite, architects, of Bloomsbury-square.



: Section :

: The · Westwood · Tomb :
: Little · Horkesley · Essex :
: W. Macandrew · Esq^re. :



: Plan :

Messrs. Habershon & Pite, Architects.

UNION BANK OF LONDON: CHARING CROSS BRANCH.

We illustrate in our present number the structure which has been erected at the corner of Spring-gardens, Charing-cross, as a branch-office of the Union Bank of London, from the designs and under the superintendence of Mr. Frederick W. Porter, architect. It is of considerable size. The length of the Charing-cross front (north) is 42 ft. 6 in.; the flank, in Spring-gardens (west), 73 ft.; and the back (south), 61 ft. The height, from pavement to the top of main cornice, is 50 ft. 6 in.; and from the main cornice to the top of roof, 17 ft. The clear height of the various stories is as follows:—Double basement, 16 ft.; bank, 17 ft. 6 in.; first floor, 12 ft.; second floor, 11 ft.; and third floor, 9 ft.

The columns, pilasters, dado, and pedestals of the ground story are of grey granite, from the De Lank quarries, near Bodmin. The columns and pilasters of the upper stories are of polished red granite. The whole of the columns and pilasters are monoliths, with the exception of the pilasters of the two upper stories, which are in two stones each. All the other masonry is of Portland stone. The clustered chimney-stacks at the angles of the building, also the terminal vases on the attic story, are of terra cotta.

All the balcony-railings, and the bank entrance-gates, are of wrought iron, executed by Mr. Winstanley. The latter are excellent specimens of ironwork, and received a premium from the Society of Arts. The curved roofs are covered with plates of embossed copper, from the manufactory of Messrs. Tyler.

Entering the building, we find that the bank-room is 47 ft. by 26 ft. 6 in., the manager's room adjoining, and separated from the latter by a glazed screen, is 17 ft. 6 in. by 17 ft. 6 in. The walls are lined with woodwork, in the form of pilasters, pedestals, &c., principally wainscot, with teak panels; the doors, window-frames, and bank fittings are of Spanish mahogany. On the same floor are also waiting-rooms, and private room for manager.

The ventilation of the bank-room is effected by means of a ventilating engine, worked by hydraulic power, placed in a small room over the bank entrance-lobby, with drawing the air through a perforated ornamental frieze below the cornice of the ceiling, while fresh air is supplied through openings under the counter, and other parts of the room.

There are two stories of strong rooms in the basement, having a total area of 3,660 ft. superficial. The intermediate floor is, to a great extent, formed of cast-iron perforated plates, resting on wrought-iron bearers, and the height from lowest floor to floor of bank, 18 ft. The remaining portions of the basement stories are used as porters' living-rooms, clerks' lavatories, and store-rooms.

The first, second, and third stories are divided into sets of apartments, each consisting of a sitting-room, bedroom, and bath-room; access to these is by an entrance in the south front next Spring-gardens.

The manager's apartments consist of rooms on the south or Spring-gardens side of the building. The wrought-iron tanks in the roof, holding 4,760 gallons, supply water to lift, ventilating engine, and baths. We have only to add, that the builders were Messrs. Perry & Co., Stratford, and the amount of their contract was 28,473*l*.

UNION BANK OF LONDON: CHARING CROSS BRANCH.—Mr. Frederick W. Porter, Architect.

SEVENOAKS WEALD CHURCH, KENT.

THIS church was re-opened on the 10th inst. by the Suffragan Bishop of Dover after enlargement by the addition of a new chancel and organ-chamber, from the designs of Mr. T. G. Jackson, of London.

The new building is of Kentish rag stone, with dressings of Tunbridge sandstone; the roofs of Baltic timber, covered with Penmoyle green slating. The window traceries are founded upon what is known as the Kentish type, of which the chancel at Chartham, near Canterbury, affords the finest instances.

The ceiling is polygonal in section, boarded below the rafters, and divided by moulded ribs into panels, which are decorated with an arabesque design in simple colours at the intersection of the ribs. The choir seats are of oak, with carved elbows and turned shafts of walnut wood, and their front book-boards, as well as the altar-rail, are carried on wrought ironwork parcel gilt.

The east window is filled with painted glass, which has been executed by Messrs. Powell, of Whitefriars, from the cartoons and under the superintendence of the architect. The general tone of the window is light, and the colouring restrained in tone; the arrangement consisting in a field of silvery glass painted *en grisaille*, across which a band of colour is formed by the figure subjects in medallions which occupy the central part of each light.

The central part of the chancel floor is laid with a rather elaborate mosaic pavement, executed by Messrs. Powell in their new opaque glass.

The contractor for the general work was Mr. Wiltshire, of Sevenoaks. The warming apparatus was supplied by Messrs. Fraser, of London; the floor tiling by Mr. Godwin, of Lugwardine; the wrought ironwork by Messrs. Gibson, of Stamford; the organ is now being built by Mr. Henry Willis, of London; the carving is by Messrs. Farmer & Brindley.

THE SAFETY OF SASH-FASTENERS.

As I left myself open to a challenge by a sentence in a former communication, I will not shrink from holding my own, while expressing thanks for each new bit of information that may come in the way. With all respect for Mr. Fletcher, I am forced to say that his communication, as far as it relates to my remarks, leaves the subject exactly where I left it.

Before making a few more observations on sash-fasteners and their safety, let me say that I spoke not as an amateur, but as one who had long practical experience of almost every form of sash construction and fastening throughout the three kingdoms, and in part of the Continent, and that the matter in discussion has engaged my attention for many years. I am, therefore, equally interested on behalf of the building profession with Mr. Fletcher in seeing some practical remedy applied, and will be ever anxious to assist in the endeavour.

In advocating rebated meeting-rails to sashes, I did not necessarily argue the adoption of either the spring fastener or the one in present use. I proposed the rebate as an additional security, no matter of what kind the fastener might be. Of course, if servants or others neglect to adjust the fastener on a sash, there can be no security in any form of sashes that work in halves like the present. Now, as to the objections to the rebate, which was intended by me for all new sashes, it does not need either a section or a model to see at a glance its action. Its sufficiency depends, as every architect and builder knows, on the thickness of the parting slip. It might be put as a little sum to a school-boy in this fashion:—"If the groove in the sash frame or the parting slip in that groove is ½ in., what will the breadth of the rebate be?" The answer is obvious. Surely, then, ½ in. or ⅜ in. rebate is quite sufficient when both sashes are well fitted and the fastener is tightened.

If it were even required to alter present made sashes, having a ½ in. parting slip, I see no difficulty in the way, though I do not advocate it as a rule. Yet it might be done with advantage to the windows in the lower stories of houses.

If the sashes were in good condition otherwise, all that would be required would be to plane off the present splay or hooking and joint and screw slips of hard wood to form the new rebates.

Mr. Fletcher must admit that with a rebate to the present ordinarily made sash, and the fastener tightened, the thief could not push back the catch with a pocket-knife, or a steel blade of any kind; but with the majority of the present sashes, there would be little difficulty indeed. He remarks that it is foreign to the subject to say that if the thief cannot get in he will resort to other modes, and he thinks that men would be afraid to carry drills, jemmies, centre-bits, diamonds, &c., and that the finding of them on their person would insure conviction. He seems to forget that there are dishonest carpenters, bricklayers, house-smiths, bell-hangers, plumbers, painters (Ishmaels of the trades), who, in carrying the above-named tools, would only be carrying the instruments of their craft, and that the finding of them in their possession by the police would not afford even circumstantial evidence of their guilty intentions. A CRAFTSMAN.

SIR,—Your correspondents in their letters seem to have overlooked three essential conditions required in a good sash-fastener,—

1st. To force the top sash up towards the head of the sash frame.

2nd. To force the bottom sash down towards the cill.

3rd. To draw the meeting rails together and prevent rattling during high winds.

"Craftsman's" screw fastener does only one of these, and I have had experience of many of this kind rendered useless by a coat or two of paint raising the bottom sash and lowering the top and causing the screw and nut not to meet.

I have given much attention to this subject and believe that nothing at present made equals the quadrant sash-fastener, and after many attempts and failures I believe I have at last succeeded in making an improved quadrant sash-fastener that will not only fulfil the conditions I have mentioned, but will also prove a safety and partially thief-proof one; but I feel convinced no sash-fastener will answer except it fulfils these conditions.

ROBERT PHILLIPS.

SITE FOR BARRACKS.

SIR,—It is possible that those who have the selection of sites for barracks may have omitted in their inspection one part of the Kent coast at present undefended except by troops from Dover or Canterbury,—namely, Romney.

In the early part of this century there were barracks at Tenterden, a town situated about seven miles from Appledore Station, on the South-Eastern Railway, through which runs the Military Canal from Hythe to Rye. Tenterden has many local advantages for troops, but Romney would, with the prospect of Dungeness Harbour, be an admirable spot for such a purpose. Some years ago, the War Office were willing to grant the Military Canal to a celebrated engineer for a railroad from Hythe to Rye, especially for the conveyance of troops.

Perhaps a word of suggestion at this moment may avail. A MAN OF KENT.

LORD DERBY ON SANITARY ADMINISTRATION.

NEARLY two years ago Lord Derby, whose family have for generations been large owners of land in the neighbourhood, laid the foundation-stone of an hospital in the borough of Bootle, which was recently only a suburb of Liverpool. Lord Derby gave a valuable site for the building, and contributed in money besides. The hospital is now complete, and has just been opened by Lord Derby, accompanied by the countess. The event was observed as a *fête* in Bootle, and after the opening ceremony the mayor entertained the earl and countess and a large party to lunch in the Bootle Town-hall, or Assembly-room. In the evening there was a *soirée* at the hospital. The customary formalities concluded,—

Lord Derby said: I congratulate the inhabitants of Bootle on the completion and opening of this hospital. We are, though not one of the smallest, yet one of the very youngest of English boroughs; but I hope we shall not be found behind our neighbours either in public spirit or in thoughtful care for the welfare of those on whose labour our prosperity depends. It is just a week since an eminent public man, speaking at Manchester on all the subjects of the day, referred to the sanitary question as that which lies at the bottom of all national well-being and greatness. Thirty years ago—perhaps even a dozen years ago—language of that kind from a political leader would have been thought eccentric and paradoxical; now it is accepted as a fair expression of the feelings and wants of the time. That is a remarkable change: let the credit of it be given where it is due. It is owing to the collective labour of many individuals, personally for the most part obscure, but who have worked in a spirit of unselfish devotion to a great and useful cause. I am not going into questions of sanitary legislation. But let me just observe this—that the conviction which sanitary knowledge brings with it as to the preventibility in general of disease is one of quite incalculable importance. Men are very slow to learn the extent to which their destinies are in their own power. They are apt to be astonished if you point out to them that nine-tenths of the calamities that have afflicted the human race are directly and obviously the work of men's own hands. They are inclined to confound that feeling which we all respect, that of cheerful acceptance of the inevitable, with that other kind of resignation to evils which are not inevitable, which is mostly laziness and apathy, and the prevalence of which is one of the most characteristic distinctions between the savage and the civilised man. And why do I say this? Because I am deeply convinced that no sanitary improvement worth the name will be effected, whatever acts you pass, or whatever powers you confer upon public officers, unless you can create a real and intelligent interest in the matter among the people at large. It is very comforting to those who have worked long years in this direction to hear how our governing men now talk, and how they are praised for it too!

WATER SUPPLY PIPES.

SIR,—Allow me to suggest to "Expertus" the only way I have found to keep water free from sewage gas; at the same time I keep the pipes empty to prevent them bursting, I do away with ball-taps, and prevent any pressure being put on the pipes after the water enters the house, and I reduce the waste of water to a minimum.

I have just finished the re-arranging of water supply to a large house, and have had the fittings fitted up as follows:—The service-pipe enters the kitchen from water company's main and passes through an apparatus (which forms a kitchen trough), and has a tap attached to the supply-pipe above the apparatus for kitchen use; the pipe then passes up into the upper cistern (without ball-tap), and after filling the cistern the overflow water runs down the waste-pipe and supplies the cisterns at lower levels; when the lowest cistern is full, one quart of water runs down its waste-pipe into the apparatus, which shuts off the supply to the upper cistern. The water is procured by lifting a lever (which cannot be tied open). This apparatus does not require any attention as it is constantly in use, it being a kitchen trough, and the tap over attached to the supply-pipe. By not using ball-taps there is no pressure on the pipes after passing the apparatus. When the apparatus is shut off the water passes out of the pipes above it, whereby they become empty; therefore the frost will not burst them. In summer time this escapement can be shut off.

I think this is a good system and should be generally adopted. CHARLES PINN, Architect.

SALTING OF PARIAN.

I SHOULD be obliged if some of your readers would suggest an explanation and remedy for a very serious case of walls saltpetreing. My walls are principally built with Portland cement, floated out with Portland and sand, and set with Parian. When finished about a week we claircoled and distempered on some and painted on other parts, when at once began the most universal process of saltpetreing I ever saw; the greater part of distemper and paint are thrown off, and in places the effervescence stands out three-eighths of an inch.

The sand was partly Thames and partly a very sharp pit sand dug on the premises. J. S.

FALL OF STAND.

SIR,—With reference to the notice you make in last week's issue of your paper about the falling of a stand to witness the laying of the memorial-stone at a new chape Kentish-town, allow us to say it was not the platform which we erected for that purpose, but an ordinary scaffold used by the bricklayers which fell, upon which a very heavy crowd stood, and insisted upon standing on after many repeated requests and cautions not to do so; and as the whole of the arrangements were entirely out of our hands for the admission of visitors on the works and platform for the occasion, we do not consider ourselves to blame, and trust to your usual fairness to give this as public a position as you have the report, that the matter may be fairly represented. The architect superintending the works, also the clerk of works, consider there is no blame attached to us. NIBLETT & SON, Builders.

STRIKES IN GERMANY.

FOR some time past the workmen have been at war with their masters in Berlin and other German towns. The Prussian correspondent of the *Times* has given some interesting details of the existing state of things. He says in their origin the strikes were not unjustifiable. Even upon the assumption that the former rate of wages was satisfactory, the workmen had a right to demand an increase. Seeing that rent and provisions had become so much dearer, why should not manual labour, too? It is admitted on all hands that the cost of living at Berlin has been doubled for large strata of the middle classes in the last six or seven years, and increased 60 or 70 per cent. even for the poor. It is nearly, though not quite, the same thing in other considerable towns. Who, then, can blame

the workmen for advancing a claim that their pay, which was certainly never excessive, should at least keep pace with what was exacted for house-rent and eatables?

The strikes began by the working-men asking for an increase of wages of 25 per cent. and a reduction of hours from twelve to ten? When they obtained their terms, peace was re-established; when they had to give in, the attack was resumed a little later, and, in many cases, with better success. The result of the entire campaign is a general rise of the price of labour by 25 per cent. in a single year.

The strike of the Berlin masons began in the June of last year, and went on for six weeks. The workmen demanded an increase of their daily wages from 2s. 3d. to 3s., a reduction of hours from twelve to ten, and extra pay of 5d. for each hour overtime. Upon this 300 builders of Berlin formed a counter association, which negatived the programme of the working men *in toto*. Negotiations were repeatedly resumed, but as often broken off, both parties remaining firm. At last the masters gave in upon the condition that their defeat should be concealed under some concessions of a merely formal nature. Since then the workmen have been giving their services for something like eleven hours at 3s. 6d. per day.

An even vaster operation was the joiners' strike, which broke out after that of the masons had been settled, and lasted nine weeks. Of the 8,000 joiners in the city, 5,000 struck; 2,000 went off elsewhere; while 1,000 married people, with large families, remained stanch to their work. The claims put forth were similar to those of the masons,—25 per cent. more wages, and a reduction of time to nine hours and a half. The masters, who in Berlin number no less than 1,000, with 300 wealthy contractors among them, answered these demands by the counter proposition that piecework, which had not been very general, should be made universal, after which they hoped to be able to allow higher wages. After the expiration of seven weeks, those masters who had taken contract work for builders, and who, owing to the steady increase of house-rent, were enabled to accord higher wages, began to relent. Thus an opening was made for a compromise, by which the weekly wages, formerly at from 15s. to 21s., were raised to from 21s. to 25s., the number of hours remaining the same. Piecework under the new conditions yields from 30s. to 36s. per week.

A TECHNICAL DICTIONARY.

SIR,—"Rabbett, *n.*, a corruption of the word rebate." Such is the decision of the editors of the last edition of Webster's Dictionary, and, as far as I can judge, that decision is accepted.

I have long felt with your correspondent the want of a trustworthy technical dictionary of the Arts and Sciences, and I am taking every opportunity to prepare such a work; but I trust some one with more ability and more leisure will outrun me. The art dictionaries we now have are very confusing and overstocked with words of use only to the antiquary. I think if half these words were omitted, and their place occupied with the every-day terms of the studio, architect's office, and workshop, a really useful work would be the result.

GEORGE ALFRED ROGERS.

LONDON WATER SUPPLY.

In the House of Commons, in reference to Professor Frankland's report, already quoted in the *Builder*, and in reply to Mr. Kay-Shuttleworth, Mr. C. Fortescue said,—Major Bolton, the water-examiner of the Board of Trade, agreed with the Royal Commission on the Supply of Water to the Metropolis in thinking that Thames water, if only properly filtered, was harmless, and formed a fit and proper supply for the use of London. That gentleman also said that during the last winter two of the companies referred to had supplied water not properly filtered; the cause of that failure being that they were at the time carrying on large works for the purpose of improving their establishments, and also owing to the heavy floods. During that time, from want of sufficient storage room, the filtration was carried on hurriedly, and the water supply was by no means what it ought to have been. Major Bolton also reported that those companies were engaged in enlarging their works in a way which, in his opinion, would remove those evils, and would meet the requirements of the case, by making large additions to the reservoirs. If it should prove that this was not the case, it would be necessary for the Board of Trade to interfere. With respect to the last part of the question, he meant to insure, so far as the Board of Trade powers extended, careful filtration of the water supplied by those and other companies. Remedial measures were being taken, and he did not think that legal proceedings need arise at present.

HEALTHY HOUSES.

THIS was the title of the paper by Councillor Gowans read at the last meeting of the Edinburgh Architectural Association. The reader commenced by stating that the kind of houses we lived in was of such vital importance, not only to ourselves individually, but to the community at large, that he did not think it necessary to make any apology for introducing the subject of his paper. As he believed it was quite possible to design and construct houses so that those who lived in them might not suffer either morally or physically, he would state what, he thought, were the faults of our present mode of arrangement and construction, and what ought to be the chief requirements of a healthy home. In speaking of what he considered necessary to keep suburban dwellings from contaminating influences, he said that the subsoil upon which the house rested should be thoroughly drained to such a depth as would secure a crust of dry soil upon which to erect the structure. The walls below the floor level, as well as the space between, should be covered over with some substance to prevent that capillary attraction which the walls of the building and the internal heat of the rooms after the house is occupied exert upon anything which would supply moisture. The external walls of the building should be of such a thickness as would allow of a house being kept at an even temperature. Gables with fireplaces could not be too thick, as thin walls, especially at the chimney-head, were sure to produce smoky vents. Bedrooms and kitchens should be of the largest dimensions compatible with the size of the structure. No drains should be allowed to pass under a building, and he held that an architect knew little of his profession if he was driven by the arrangement of his plans to carry them there. Drains should never be allowed to pass further into a house than half the thickness of the outer wall, and if such were the law, he believed much less disease would exist in the city. He did not wonder at people getting into bad health, or having their constitutions so deteriorated and made liable to the attacks of every epidemic, when he considered that most of the pretentious houses in the suburbs of the city had drains passing underneath them. Such drains, from their faulty construction, permitted the sewerage to soak the base of the building, and render it a hotbed for the generation of disease. If drains were kept outside of buildings, he held that it was quite possible to trap them so that no bad air from the main sewers could find its way into the house. He knew that the trap generally in use was not effective for this purpose, but he had himself devised a double trap which completely secured the desired end. As to the cisterns of houses, he considered they should be placed where they could be easily reached, and where they would be free from contamination of any kind. He would have a room in the house, with plenty of light, entirely devoted to the main cistern of the building—a place into which the occupant could go as freely as into any open part of his dwelling, and where he could observe that such an important element as water was pure and wholesome. There should be no limit to the number of windows, and the position of the rooms in regard to light should guide the architect in fixing the fronts of his building. He considered that a great mistake was made by the builders of detached villas in making the entrance to the dwelling through the principal front of the house. This arrangement, of course, could not be avoided in street houses, but in suburban villas an architect had no excuse for adopting such a course. Mr. Gowans then went on to refer to street buildings. He objected to the main drains being allowed to run along the centre of the streets, because, as the kitchens, sculleries, and water-closets were generally at the back of the buildings, it naturally followed that the drain passed under the house before it could reach the main sewer. The only cure for this state of matters, he felt, was to have the sewer running along the back of the building, and the clean water in the front. He spoke against the system of having water-closets in the centre of buildings, and maintained that more than enough of water could not be had in order to keep drains pure.

SCHOOL-BUILDING NEWS.

Manchester.—The Bradford Memorial Schools were opened on the 1st inst. They are Gothic, simple in detail, with lofty belfry to principal roof. The chief school is 80 ft. by 35 ft., with two class-rooms, each 20 ft. by 16 ft. Separate entrances are provided, with lavatories adjoining. The site is inclosed with wrought-iron railing. The whole of the works have been executed by Messrs. R. Neill & Sons, builders, at an outlay of 1,600*l.*, under the superintendence of Mr. John Lowe, architect, Manchester.

Chorlton-upon-Medlock (Manchester). — St. Paul's schools, which stand in Higher Temple-street adjoining the church, were opened on the 9th instant. The lower story was erected a few years ago, and the additions which have just been finished complete the building. It now comprises a large room (64 ft. by 30 ft.) on each floor, and five class-rooms, besides the usual offices for boys, girls, and infants, and boiler-room and other arrangements required for tea parties. The rooms are fitted up with desks and galleries, are warmed by means of open fireplaces and Haden's heating apparatus, and are provided with means of ventilation. The roof of the upper room is open to the collar-beam, and the woodwork of this and other parts of the building is stained and varnished. Access is provided to the upper floor by means of two stone staircases. The building is of brick, faced externally with white headers, and with stone dressings to doors, windows, and other openings. The gable end in Higher Temple-street has the large windows of the upper floor filled in with stone plate tracery, while the apex of the gable coping is finished with a wrought-iron finial. The elevation to Frances-street is agreeably broken up by three gablets, the centre one of which also has a wrought-iron finial. The building has been erected from the design of Mr. John Lowe, architect, Manchester, by Messrs. Davies & Maudsley; the present additions costing about 1,700*l.*

York.—St. Lawrence and New Fulford Mission Schools have been opened. The schools occupy a position in the suburbs, on a plot of ground immediately in rear of the church of St. Lawrence, and comprise a boys' school, 45 ft. by 20 ft.; girls', 50 ft. by 20 ft.; and infants', 50 ft. by 24 ft. There are also two class-rooms and out-offices, and the building has three separate entrances. The structure is of red bricks with stone dressings, surmounted by a spiral bell-tower. It is roofed with patent self-locking tiles from Hornsea. There is a high-pitched open roof, boarded; the rooms are well ventilated and lighted, fitted with gas, and heated with Gurney's stove. The boys' school is divided from that of the girls' by an arch of stone corbels with granite shafts; and each of the schools has been erected and fitted up in accordance with the rules of the Committee of Council on Education. On the side of the schools facing the church is a Gothic window, and the only separation from the churchyard is a light palisading. The entrances to the schools are from the lane leading from Lawrence-street to Heslington-road. The playgrounds are spacious and asphalted, and are enclosed by low walls and palisading. The cost of the schools has been upwards of 2,260*l.* The feoffees of the parish gave the site. Mr. C. T. Newstead, of York, was the architect. Mr. J. Brown had the general contract, the various works required having been executed under his superintendence by the following firms:—Mr. Warin Taylor, brick and stone work; Mr. G. Bailey, mason's work; Messrs. Hodgson, plumbing and glazing; Mr. Armitt, painting.

Sheffield.—St. Silas's new schools have been opened. The new building adjoins the existing school. Its exterior is remarkably plain. The building is in the shape of the letter L, and consists of a boys' and girls' school, each capable of accommodating 300 scholars. In addition to these large rooms, there are four for class purposes. The old school-room will now be used as an infant school, and it will afford accommodation for 350 children.

Parkgate.—On the 9th inst. the foundation-stone was laid by Lady Gertrude Foljambe of new Church of England Schools, at Parkgate,

near Rotherham. They consist of large mixed school, with class-room; and infants' school, also with class-room attached. They will accommodate a little over 400 children, and the cost will be about 1,200*l*. The material will be stone from the local quarries. The style is Early English. Messrs. Tacon & Rawson are the architects.

St. Briavels.—A new school has been opened here. It is intended also to erect a master's residence, making the total outlay 850*l*. The site was given by the late Mr. Peel, of Aylesmore, and the architect is Mr. W. T. Allen, of London, the vicar's son, who has given his services, and the builder is Mr. Meredith, Gloncester. There is a turret with spire. Accommodation has been provided for 170 children, with a class-room for sixty infants.

Cheadle.—The foundation stone of a new Wesleyan Sunday School, in Charles-street, has been laid. The building will be of brick, with stone dressings, its dimensions being 61 ft. by 32 ft. inside. The cost of the site and the building will be about 1,000*l*. The architect is Mr. Wm. Sugden, of Leek, and the builders are Messrs. Collis & Waugh, of Cheadle.

Hulme.—The new schools recently erected in connexion with St. George's Church, Hulme, and which are situate in Arundel-street, Chester-road, have been opened by the Bishop of Manchester. The schools will accommodate about 1,100 scholars, and have been built by Messrs. S. & J. Higham, contractors, Cheetham, from plans and designs prepared by the architect, Mr. Ernest Bates, of Manchester, and are in the Gothic style of architecture. There are separate rooms for boys, girls, and infants, and attached to each are a class-room, and room for hats and cloaks. The principal room is 81½ ft. long and 32 ft. wide, and is fairly ventilated and well lighted, and has two large traceried windows. The rooms are lofty. The principal entrance to the boys' school is in Ellesmere-street, to the girls' school in Cawdor-street, and to the infants' school in Arundel-street. The entire length in Ellesmere-street and Cawdor-street, is 73 yards, and in Arundel-street 20 yards. The cost of the building has been 4,500*l*., towards which sum 1,000*l*. have been contributed by Lord Egerton. The site was given by the Bridgewater trustees.

Wakefield. — The new Wesleyan Sunday School buildings are designed by Mr. William Watson, of Wakefield, architect, and are intended to be built of brick, with stone dressings. They consist, on the ground-floor, of principal entrance facing South-parade, with spacious staircase; the large room, 71 ft. long, 33 ft. wide, and 20 ft. high; and a class-room, 14 ft. by 13 ft. On the first floor are planned a school-room, 33 ft. by 31 ft., and 15 ft. high; five class-rooms, each averaging 14 ft. by 13 ft. In the basement are arranged the heating apparatus-room, kitchen fitted with boilers, &c., and other conveniences; from this floor, on the level of Graham's-terrace, is an entrance and staircase to the large room. On the ground and first floor are proper water-closets, lavatories, &c. The contracts for the various works amount to 1,481*l*., and the contractors are Mr. George Fawcett (who is also contractor for the restoration of the parish church), for the brick and stone work; Mr. C. F. Rycroft, slating work; Mr. Charles Driver, plastering work; Messrs. Craven & Lloyd, carpenter and joiners' work; Mr. W. Woodhead, plumbing and glazing work; Mr. S. Kirk, ironwork; Mr. C. Turner, and Messrs. G. Blake & Co., of Coventry, for the heating apparatus, which is on the hygrometric hot-air system. The memorial stone of the new building was laid last week.

Dukinfield (*near Manchester*).—The foundation-stone of St. Mary's Schools was laid on March 30th. Accommodation is provided for 200 children. Mr. Colbeck, Ashton-under-Lyne, is builder; and Mr. Edmund Kirby, of Liverpool, architect.

Stratford.—On Wednesday, new National Schools, which are situated in the densest part of Stratford, were opened by Mr. N. Powell, J.P. They are capable of accommodating over 900 children, and consist of boys', girls', and infant schools. Mr. W. F. Meakin is the architect, and Mr. James Rivett the builder. The cost of their erection has been 4,383*l*. Mrs. T. Curtis gave the freehold, the value of which is estimated at 1,000*l*.

Rawtenstall.—The corner-stone of a church school for the district of Constablee has been laid. The school is to be a stone building, in the Gothic style of architecture. The principal room will be 81 ft. in length by 26 ft. in breadth. Besides this there will be two class-rooms, each 15 ft. by 16 ft., with cellars underneath for heating apparatus, &c. The school will accommodate upwards of 300 children. The plans are by Mr. B. W. Jackson, of Halifax. The site is given by Mr. Taylor, who is also the largest contributor to the building fund.

Cheshunt.—The new girls' and infants' national schools, Church Fields, have been opened by the Bishop of Rochester. Mr. Barker, of London, was the architect, and Mr. Bentley, of Waltham Abbey, the contractor. The site was presented by the Rev. Alfred Preston, formerly curate of Cheshunt. The cost of the schools was 1,250*l*., which sum was raised by voluntary subscription. The porch was the gift by legacy of Miss R. Preston, sister of the founder of the schools. The structure is intended for the accommodation of about 250 girls and infants.

Kilnhurst.—A new school in connexion with the parish church of Kilnhurst has been opened. The plans were prepared by Mr. Blackmoor, architect, of Rotherham, and the building has been erected by Mr. Simmonds, of Kilnhurst.

Handborough.—Handborough schools, now re-opened, have recently been very much enlarged, so as to meet the Government requirements. This has been effected through the liberality of various voluntary subscribers interested in the work. The additions to the schools were made in accordance with a plan furnished by Mr. Wilkinson, of Oxford, and have been carried out by Messrs. Merry & Mansell, of Handborough.

CHURCH-BUILDING NEWS.

Hull.—The plans of Messrs. Adams & Kelly, of Leeds, architects, have been selected, after a competition, for the erection of a new church in Holderness-road, to be dedicated to St. Andrew. The church will cost about 5,000*l*.

Folkestone.—The committee for repewing the parish church, with Messrs. Stallwood (the architects), received the following tenders for re-pewing the church, erecting a new porch, and for the enlargement of the vestry:—Dunk, 1,072*l*.; Webster, 948*l*. 2s. 10d.; Holdom, 919*l*. 19s.; Bowley, 825*l*. 10s. It was agreed to accept the lowest tender. Some discussion took place as to reflooring the church with Minton tiles, for which a separate estimate had been given by the builders. Mr. Stock said that he objected to having the stones in the church removed, many of which contained inscriptions, to be replaced by a gaudy pavement. Mr. Woodward said it was not the intention of the committee to do this at present, although he wished it could be done, and the work be finished at once. The secretary said they had 220*l*. in hand, and altogether 350*l*., and the vicar stated that by Easter they would have 600*l*.,—enough to commence with.

Bristol.—The little old-fashioned church in Dowry-square, used as a chapel-of-ease to Clifton parish church, is in such a sad state of dilapidation that it has been determined to take it down and rebuild it in a style more convenient and more in harmony with modern usages. All the available material of the present building will be employed in the construction of a church capable of seating 500. The old-fashioned high-backed pews will give place to open seats of pitch pine. The building will consist of a nave, side aisles, and chancel, with a tower at the south-west corner. It is proposed to divide the nave into four bays, with moulded arches, labels, and carved terminals, the last of which will extend into the chancel, and will be filled in with wrought-iron screens. The column nearest the chancel will have a carved foliated cap, from which will spring the chancel arch. The reredos will be of marble and other stone. There will be no east window, the building at that end extending to the adjoining houses, and in its place there will be a recess immediately over the reredos, filled in with geometrical tracery, and upon the panels will be painted the Lord's Prayer, the Creed, and the Ten Commandments. The outside of the building will probably be of freestone and Pennant, and the internal columns will be of blue Pennant. The church will be paved with encaustic tiles. The total cost is estimated at about 2,000*l*., of which a considerable portion has yet to be raised. We understand that the work will be commenced soon after Easter.——The foundation stone of St. Nathaniel's Church, which is intended to meet the wants of the population of that part of Cotham near Lovers'-walk, has been laid. The foundations of the edifice are already laid, at a cost of nearly 900*l*. The church, which is intended to accommodate 700 persons, will be in the Early Gothic style, the chief material being Pennant stone, with freestone dressings. The roof will be open-timbered, and covered with slate. There will be a tower and spire, 150 ft. high to the vane, at the south-east corner of the church; and the principal entrance will be on the south, or Elm Grove-road, side of the building. Under the tower will be vestries for the clergy and choir. The chancel will be octagonal, and have a boarded roof; and on its north side will be an organ-chamber. The seats will be of red deal, stained and varnished; and the building will be warmed by one of Haden's heating apparatus. Messrs. Wilkins are the builders; Mr. Bevan is the architect. Between 3,000*l*. and 4,000*l*. have been raised towards the cost of the building.

Ruabon.—The parish church of Ruabon has been re-opened after restoration. The organ, upwards of a century old, built by Snatchley, and originally the gift of the Wynnstay family, has been entirely remodelled by Messrs. Gray & Davison, of London, at the cost of Sir W. W. Wynn, bart., M.P., who also, at his own expense, repaired and considerably beautified the chancel, and besides has subscribed the greater portion of the sum raised for the whole of the works. The restoration has altered the appearance of the interior. An entirely new roof has been put up, the stone pillars which supported the arches between the nave and side aisles have been replaced by others of a lighter character, and the pews have given way to open sittings, free and unappropriated. The gallery at the west end is to be replaced by a smaller one. The whole of the works, which, in addition to those mentioned, include others of a minor character, have been carried out by Mr. Wm. Williams, of Bangor, under the superintendence of Mr. Ferrey, of London, architect.

Illingworth.—St. Mary's Church has been closed for some months to undergo a restoration internally. In the re-arrangement of the seats, the architect has found it necessary to re-plan the area, to fit the purposes of the modern style of service, the centre aisle remaining as at present, but the side aisles will be placed immediately against the walls, thus bringing the congregation together to form two masses. The whole of the seats will be open and free, the ends and rails being in pitch pine, and the rest in deal. The organ will be placed at the south side of the communion, with the singers' stalls in oak on the north and south sides of the altar-steps. The pulpit will be placed in front of the altar-steps, at the south corner. The west gallery will be entirely filled with children's seats, and will give accommodation for about 145. The north gallery will remain as at present, except that the high doors will be taken away. The oak fronts to the galleries will be cleaned from paint and varnish, and left in their natural state. An increase will be made in the accommodation by this renovation for 37 adults and 40 children, in addition to 250 sittings which will be made available for the use of the rapidly-increasing population. The estimated cost is about 600*l*. Mr. J. Henry Wadsworth, of Halifax, is the architect; and the various artificers' works are let to the following contractors:—Masons' work, Mr. W. Farrar, of Holdsworth; joiners' work, Mr. T. Plant, of Halifax; plumbers' work, Mr. J. Holdsworth, of Halifax; painters' work, Mr. J. Hodgson, of Queensbury; and Messrs. W. & S. Thornton, of Huddersfield, will supply the heating apparatus.

Armley. — The foundation-stone of a new church, to be dedicated to St. Bartholomew, has been laid at Armley. The old church known by that name will give place to the new edifice. The site of the new church borders on the churchyard. The designs of the building have been prepared by Messrs. Walker & Athron, architects, Leeds. Its proportions will be considerably larger than the existing church. The estimated cost is 15,000*l*., and already subscriptions amounting to 9,600*l*. have either been received or promised. Mr. S. E. Wilson has contributed towards the building fund 5,000*l*. The plan of the building is that of a Latin cross, consisting of nave, six bays in length, transepts, and sanctuary, with roofs of equal height, and a tower at the intersection. The nave has aisles, north and south, with porches opposite the westernmost bays of the nave arcade; and the vestry is placed in the angle formed by he junction of the sanctuary with the south transept. The sanctuary is apsidal, and the tower is surmounted by a saddle-back roof; and both

sanctuary and the space under the tower are intended to be vaulted. The church is to be built of local sandstone, and faced internally with limestone from the Ancaster quarries. The design is Early English, and its symmetrical proportions and simplicity of detail, combined with the size and solidity of the structure, forcibly remind one of the architecture of our Yorkshire abbeys. The principal dimensions are as follows:—Length of church, 157 ft.; width across transepts, 65 ft.; length of nave, 98 ft. 6 in.; width of nave, 30 ft.; width of transepts and sanctuary, 27 ft.; height to wall-plate, 46 ft. 6 in.; ditto to ridge of roof, 73 ft.; ditto to summit of tower, 153 ft. The contractors are,—Mr. H. Brumby, mason; Mr. J. Hall Thorp, joiner and carpenter; Mr. W. B. Myers, plumber; Messrs. Nelson & Sons, ironfounders; Mr. Ezra Walker, painter; Mr. R. Branton, plasterer.

DISSENTING CHURCH-BUILDING NEWS.

Colnbrook, near Windsor.—A new chapel, with vestry and schoolroom adjoining, has recently been erected in this town for the Baptist denomination. The building is of the Corinthian style of architecture, with a red brick front and white stone dressings to windows, &c., the whole being executed at a cost of about 800*l.* The internal arrangements are the same as usually adopted in modern places of worship, comprising three rows of seats, with gallery immediately over the entrance, the whole being stained and varnished. The warming apparatus, on the hot-air principle, was executed by Mr. Harris, of Thame. Mr. Daniel Singer was the contractor, the brickwork and masonry being executed by Mr. Henry Mole. The work was superintended by Mr. James Wells, of Thame.

Penistone.—Mr. John Rhodes, of Penistone, has sold to the Wesleyan congregation a plot of land, upon which it is proposed to erect a new chapel, with school-room, class-room, &c., underneath, and minister's vestry, organ-gallery, &c., at a cost of 1,000*l.*, exclusive of cost of site. The building will be in the Gothic style of architecture, from designs prepared by Mr. Moxon, of Barnsley. Accommodation will be provided in the chapel for 400 persons, and in the school-room for 200 scholars. It will be in the midst of a population of about 2,000 persons, and in the immediate vicinity of the extensive steel and iron works of Messrs. Charles Cammell & Co.

Hollingworth.—The foundation-stone of a new Congregational chapel and school at Hollingworth, near Hadfield, Cheshire, has been laid. The new edifice will be in the Gothic style of architecture, built of stone obtained from Millbrook quarry, and faced with Dunford Bridge parpoints. There will be a tower, with buttressed angles, and slated spire. The total height is 86 ft. The chapel will be lighted at the sides by pointed three-light windows, and the bays will be marked by buttresses between the windows. The total length of the chapel, measured in the centre, exclusive of the entrance, will be 62 ft. 6 in.; the width, 40 ft.; the height, from floor to ceiling, will be 36 ft. The chapel will accommodate about 500 people. The school will be under the chapel, of the same size, the floor on a level with the ground, and 14 ft. high. There will be six class-rooms, three at each end. The walls will be plastered inside, and the school will be lighted by three three-light windows on each side. The schools will accommodate about 600 children. The buildings will be warmed by means of hot air or hot water. The site will be enclosed by stone walls, with gates at the front and side entrance. Mr. Henry Pinchbeck, of Manchester, is the architect; and Messrs. Higham Brothers are the contractors.

Tunstall.—The memorial stones of the new Wesleyan Chapel, Harriseahead, have been laid. The site of the building is in a central and public position. The style is Gothic, and the materials to be used are red bricks, relieved by bands and voussoirs of blue and white bricks. The plan of the chapel, which will accommodate about 380 persons, is that of a parallelogram, 45 ft. by 35 ft. internally, and is approached from the front through a porch, 6 ft. wide, and inner vestibules. At the rear of the chapel, behind the pulpit platform, will be the orchestra, with a class-room underneath. The principal front of the building has a three-light window, the heads of which are to be filled up with tracery. The central part of the front is to be finished with buttresses on each angle, with stone terminals rising somewhat above the roof. On each side of the central front gable will be the two circular vestibules, terminating with roofs at a somewhat lower level than the other part of the front. Each side of the chapel is divided into four bays by buttresses, with a two-light window in each bay. The ground-floor of the chapel, and the gallery across the entrance end, will be fitted up with open benches, and a number will be free. The woodwork, internally, will be partly of pitch pine, and the whole will be stained and varnished. The designs are by Mr. G. B. Ford, architect, Burslem, and are being carried out by Mr. Samuel Booth, builder, Kidsgrove. The cost of the building, exclusive of land, will be about 1,300*l.*

Finchingfield.—The Congregational chapel at Finchingfield, which has undergone extensive alterations and improvements, has been re-opened. The works carried out in the restoration and improvement of the building comprise the following, viz.,—Reflooring and reseating with benches of stained and varnished deal throughout the ground floor and gallery. A platform, containing pulpit and deacons' seat, has been constructed at the end of the chapel, with a door on each side of the pulpit to the minister's and deacons' vestries, the end of the building being relieved with a large arched recess. The gallery-front has been lowered, and new windows and doors have replaced the old throughout the building. An external loggia, the entire width of the chapel, has been erected in front, forming two lobbies to the body of the building below, and containing a staircase on each side to the gallery above. The chapel has been heated by means of hot-water circulating-pipes. The walls, ceiling, &c., are distempered and painted in plain colours. The works, which have cost a sum of over 500*l.*, have been carried out by Messrs. Cole, builders, of Thaxted, under the direction of Mr. C. Pertwee, architect, Chelmsford.

Fenton.—The memorial-stone of a new Wesleyan chapel at Fenton has been laid. The style adopted is Italian. The materials to be used are red bricks, with bricks of other colours sparingly introduced for relief, and Hollington stone dressings. The accommodation in the chapel will be for about 700 persons, and a portion of the sittings will be free. At the rear of the chapel will be a class-room and a minister's vestry. The central portion of the front gable will contain the two entrance-doorways and a five-light window, with traceried head. The interior woodwork will be of pitch-pine and red deal, stained and varnished. The building is to be warmed by hot air, and the front of the site is to be enclosed with iron railing and gates, with stone piers. Mr. G. B. Ford, of Burslem, is the architect; and Mr. T. Newbon, of Longton, the builder. The amount of the contract is 2,100*l.*, exclusive of lighting and heating, and the total outlay will be about 2,350*l.*

Books Received.

The Elementary Education Act, 1870 (33 & 34 *Vict., c.* 75), *and Elementary Education (Elections) Act*, 1871; *with Introduction, Notes, and Index.* By HUGH OWEN, Jun., of the Middle Temple, Barrister-at-Law. And an Appendix. Seventh Edition. London: Knight & Co., Fleet-street.

THE present edition of this work contains, in addition to the several orders of the Educational Department as to applications for and the elections of School Boards, the new code as to Parliamentary grants, the general order of the Poor-Law Board, and the instructions of the Education Department as to the accounts of School Boards, suggestions as to the planning and fitting up of schools, &c. The accuracy and utility of the work are testified by the number of editions through which it has already passed.

Transactions of the Indian Engineers' Association; for the half-year ending June, 1871. Vol I. Calcutta: Printed by H. C. Gangooly & Co., 23-24, Mangoe-lane.

THIS interesting association, which seems to have been started entirely by native engineers, was established on a permanent basis in January, 1871. It regularly holds monthly meetings, and the present volume contains interesting and able papers by native Indians on various subjects, and in good English, such as On the Laterites of the District of Bancoorah, by Baboo Jodu Nath Roy; Notes on Brick-making, by Baboo Khetter Mohun Bose; on the Temple of Juggernauth, by Baboo Radhica Prosaud Mookerjee; a Brief History of the Steam-engine, by Baboo Madhub Chunder Roy (one of the three secretaries, all natives); Memoranda on Macadamising Roads in the Province of Bengal, by Baboo Jodunath Roy. There are also an Appendix containing extracts from Professional Papers, and several plates, besides some business-like observations on the objects of the Association, and on the proceedings, by Baboo M. C. Roy, hon. sec.; besides whom there are the two other secretaries, Baboo Nilmony Mitter, and Baboo Deno Nath, sen. The president and vice-presidents are not yet elected.

VARIORUM.

THE economy of heating greenhouses by means of gas has been more than questioned by some of our correspondents. It would of course depend to some extent on the mode adopted. A writer in *The Garden* says on the subject:—"Wherever gas is to be had at a reasonable price I am convinced that it is much more economical to heat a greenhouse with it than with an ordinary boiler; and where a large greenhouse is in question it will pay any one well to make his own gas. Outside a room, 17 ft. by 10 ft., and 10 ft. high, I have a small conservatory, 7 ft. by 3 ft., just covering the opening of the window, which has been taken entirely out. Round this little greenhouse runs a 1½ in. iron pipe, communicating with a copper boiler outside on the leads. This boiler is broad and shallow, and during the last two winters I have maintained a temperature of 50 degrees, without any fire in the room, by merely lighting the gas under the boiler from eight o'clock at night until the same hour the next morning. Of course the boiler is sheltered from wind and rain. The burner, which is one of those known as a 'roarer,' is 5 in. high, and shaped like the chimney of an ordinary paraffine lamp, rising up through a globe. The gas enters the gaspipe and passes to the globular part of the burner, where the pipe is closed, except at an orifice considerably smaller than an ordinary sized pin's head. Through this hole the gas rushes upwards towards the tube or chimney, and before entering it becomes completely mixed with air in its passage through the central opening. On applying a light at the top of the chimney, the mixed gas and air unite to form an almost colourless flame, which emits intense heat, accompanied by a 'roaring' noise, which, however, paradoxical as it may appear, is very slight." If owners of greenhouses were to place the heating pipes so that they could be regularly blackleaded, they would find a saving in fuel of at least fifteen per cent., after all expenses attending the process were paid.——"Building Societies and Borrowers," by C. D. A. Friedlein, offers refutations of principles on which permanent building societies have been worked; illustrates the mutual interest and security which borrowers, investing members, and depositors should have in building societies; and the extortionate rate of interest paid by borrowers in building societies worked upon unsound principles. Its tone is shown by the circumstance that on its first appearance an injunction in Chancery was asked for against its publication, but it was refused. Some of the building societies certainly want looking into.——Binding together the little "Shilling" books, by Mr. Edward Walford, Mr. Hardwicke has issued a most compact "Peerage, Baronetage, Knightage, and House of Commons." It makes little more than a pocket volume, and is wonderfully comprehensive.

Miscellanea.

Opening of a New Cattle-Market at Leicester.—A new cattle-market has been laid out on nearly twenty acres of land and opened in the south-western suburbs of Leicester, at a cost to the corporation of something like 30,000*l.* It is laid out in the most improved manner, and comprises not only an area of several acres for horse-fairs, but also ten slaughter-houses, in two blocks, for cattle, two for pigs, and one for condemned animals; besides offices and houses for the clerk and other officers connected with the market. The slaughter-houses are connected with the main line of the Midland Railway by a short branch line; while close to the market the Midland Company have, at a cost of about 10,000*l.*, constructed cattle-docks, from which cattle have easy access to the market, and *vice versâ*.

The Prosperity of Berlin.—Writing under this head, the correspondent of the *Manchester Guardian* at Berlin says:—"Joint-stock companies are springing up daily like mushrooms, and for every conceivable branch of industry. Mines, railway stock, breweries, gutta-percha, new streets and new suburbs, sewing-machines, chemical works, &c., offer a wide field for the choice of investors. . . . The Berlin Exchange, one of the largest and handsomest in Europe, is no longer nearly big enough for the immense increase of business, and is to receive considerable additions. . . . . In the neighbourhood of Französisch Buchholtz, a few miles from Berlin, a handsome carriage stops before the door of a milkwoman's cottage, and a gentleman asks if she is the owner of the plot of ground. The woman is rather taken aback, and before she can answer, the stranger continues: 'Will you take 10,000 thalers for it?' Had he offered 500 she would probably have closed at once; but the liberality of the offer made her hesitate. 'I must first consult my son in Berlin,' was accordingly the reply. The son, who keeps a beer-shop, is consulted, and says, 'Mother, I smell a rat. You may get twice the sum if you stick out for it.' The next day the gentleman offers 20,000 thalers. 'Well,' says the woman, 'I must consult my son once more.' The son shakes his head more wisely than before, and advises his mother to refer the intended purchaser to himself. Next day he says to the applicant, 'Ah, sir, you have come just too late. I sold the land to a company yesterday for 50,000 thalers to build a manufactory on, and am to sign the agreement to-morrow.' 'But if I give you 60,000 thalers, what then?' 'Why, then, of course you have the preference.' The bargain was struck at once."

Accident at the New Colonial Offices.—Mr. Bedford has held an inquest at Westminster Hospital on the body of Patrick Collins, aged 46, a labourer employed at the extensive range of buildings now being erected in King-street, Westminster, for the new Colonial Offices. Michael Mahony, a labourer, said that on the 8th inst. he was working with the deceased at the new Colonial Offices. They, with other labourers, were employed in moving scaffold-poles across a wall from one side to the other. They were standing on the top of the brick wall, which was 14 in. wide, and 75 ft. in height from the ground. The work had been finished, and the scaffolds taken away, all but a few of the poles and putlogs, which they were then removing. The deceased, who was standing on the top of the wall, was in the act of handing a pole across, when his foot slipped, and he became giddy, and fell off the wall on to the ground below, striking his head in his descent against one of the putlogs. He fell more than 75 ft. Deceased and other men complained of the work being dangerous. The jury, after some deliberation, returned a verdict of accidental death, but added their opinion that the manager of the works should take precautions to prevent accidents amongst the workmen.

House Property.—At a recent sale of house property by Mr. F. Godwin, at the Auction Mart, Lothbury, the following prices were amongst those realised:—No. 107, Fulham-road, held for an unexpired term of 34 years at 15*l.* ground rent, 575*l.*; No. 8, Brompton-square, held for an unexpired term of 48 years at 7*l.* 10s. ground-rent, 770*l.*; No. 9, Brompton-square, held for an unexpired term of 48 years at 7*l.* 10s. ground-rent, 750*l.*; 54, Brompton-square, and 2, Cheval-place, held for an unexpired term of 48 years at 7*l.* ground-rent, 900*l.*; 16, Exeter-street, Chelsea, held for 1½ year at 4*l.* 5s. ground-rent, 135*l.*; 12, Motcomb-street, held for an unexpired term of 29 years at 7*l.* ground-rent, 1,180*l.*; No. 13, Motcomb-street, held for an unexpired term of 51 years free of ground-rent, 1,620*l.*; No. 14, Motcomb-street, held for an unexpired term of 33 years free of ground-rent, 1,260*l.*; No. 18, Wilton-place, Belgrave-square, held for an unexpired term of 50 years at 6*l.* 6s. ground-rent, and let for 15 years at 140*l.* per annum, 2,600*l.*

The South Kensington Museum.—A public meeting was held at Westbourne Hall, Paddington, in furtherance of a movement for the opening of the South Kensington Museum on Sundays. Resolutions were adopted to the effect that a petition to Parliament be submitted, praying for the opening of the Museum on Sundays, and appointing a deputation, who have since waited on Earl de Grey and Ripon and the Right Hon. W. E. Forster.

The Restoration of Croft Church.—A consistory court, says the *Darlington Times*, has been held in the parish church, at Croft, before the Right Hon. T. E. Headlam, M.P. for Newcastle, chancellor of the diocese of Ripon, to consider an application made by the Rev. Frederick Henry Law, Rector of Croft, for a faculty authorising them to take down and entirely remove the chancel of the church and vestry on the north side thereof, and the pews and sittings and other erections now in the chancel, and also the pulpit and lectern, and to rebuild and restore the said chancel and vestry, and to replace therein the pulpit, lectern, pews, and sittings, and for other purposes set forth in the citation. At the conclusion of the inquiry, the chancellor said the church ought to be restored throughout, as well as the chancel. The great difficulty was that the clergyman had submitted a clear and definite plan, while the opposition had no counter scheme to present. He thought it exceedingly desirable that the parishioners should put into a clear, definite shape what they proposed to do; therefere he proposed to delay the issue of the faculty to give them time to apply to the court, and he thought it would be wise on the part of the rector to make considerable concessions; and the court might then adjudicate. It was finally resolved that the faculty should take effect in three months, with this condition. Mr. Street and Mr. Fowler have respectively reported on the state of the church, and in favour of the rector's views.

The late Rev. W. H. Black.—We mention with exceeding great regret the death, on the 12th inst., of a remarkable man, the Rev. W. H. Black, F.S.A., the Palæographer of the British Archæological Association. Mr. Black died at Mill-yard, Goodman's-fields, the place of his pastorate, at the age of sixty-two (according to the *Times* obituary: we should have thought him older), and will be buried at Abney Park Cemetery, on (this) Friday, the 19th, at half-past two o'clock. We have often had occasion to speak of his rare skill in rapidly mastering the contents of ancient documents, and conveying the pith of them in a popular form to a mixed audience. He was equally genial and erudite.

London Institution.—At a *conversazione*, on the 17th inst., a lecture "On Colour," by Mr. F. S. Barff, was delivered. It treated of,—Fallacies respecting colour—Chemical illustrations—Composition of the sulphide of mercury; action of heat upon it; action of friction on the volatilised sulphide—Changes produced by heat in certain metallic iodides, and in crystals of cobalt and copper salts—Structure of the eye; comparison of its functions with those of some other organs of sense—Pure colour—Colours viewed by different coloured lights—Illustrations with the electric light—The Spectrum—Absorption of portions of white light—The three primitive colours—Methods of testing the purity of pigments by the prism—and Fluorescence.

Fall of a Girder on the Midland Railway.—On Tuesday last, Benjamin Gamin died in the infirmary of St. Pancras Workhouse from the effects of an accident which took place by the falling, or, as it is alleged, the breaking of an iron girder on the Midland Railway. The deceased and other workmen were employed on Monday afternoon in removing a girder for some improvements which were being effected at the bridge which crosses the Midland Railway at the Camden-road. They had just succeeded in swinging the iron girder, when, it is stated, it suddenly broke in three pieces, one of which, a heavy mass, fell upon the unfortunate man Gamin, crushing him in a frightful manner.

The Proposed Covered Cab-stand at Knightsbridge.—Shopkeepers of Knightsbridge and others have memorialised the Westminster District Board of Works against the endeavour,—first proposed in the *Builder*,—to improve poor cabby's hard position, by adding a cover to his stand, and enclosing a part of it as a waiting-room. The Board, however, had already given their consent, conditionally, to the proposal, and have sent a copy of the memorial to Colonel Henderson, of the police, whose plan it is.

Imperial Theatre, Newington Causeway. We are asked to say that the dimensions we gave as the size of stage, viz., width 30 ft. and height 40 ft., are the measurements of proscenium opening. The stage will be 67 ft. wide and 58 ft. high.

The Proposed New Fruit and Flower Market for the City.—The Markets Committee have reported to the Court of Common Council, recommending that the Farringdon Market should be reconstructed as proposed, at a cost not exceeding 150,000*l.* The rents, it is anticipated, will be increased from an average of 712*l.* a year to 9,592*l.*, and the tolls and casual lettings from 507*l.* to 4,000*l.* The Council have adopted the report, and given the committee authority to apply to Parliament for the requisite powers, and to raise the necessary sum.

Hucknall Church and Byron's Grave.—A correspondent of the *Notts Guardian* states that with the view of realising a monument worthy of Byron in Hucknall Church, where his remains and those of Ada lie, a sum of 2,150*l.* has already been subscribed towards the reparation and enlargement of the church itself, by residents in the locality, and that aid is now further wanted from the public to promote the objects in view. The plans for the restoration have been prepared by Messrs. Evans & Jolly, architects, Nottingham.

Fixed Indian Ink.—We have received from Mr. Laurence Cowen some fluid Indian ink, which has this advantage, amongst others, over ordinary Indian ink, that it will not move under colour; tint after tint may be applied without disturbing the lines. The somewhat ugly plan hitherto pursued of colouring at the back of tracing-cloth and paper may thus be superseded. It is claimed for the new material, too, that it will remain in a fluid state, and when in use does not turn ropy.

Recreation Ground at Deptford.—Mr. W. J. Evelyn has signified his willingness to allow the townspeople of Deptford to use six acres of ground for purposes of recreation, a nominal rent only being charged. The ground is to the west of Old Sayes Court Farm, and, as including the site of the house in which Peter the Great is said to have lived while learning the art of shipbuilding in this country, possesses historical interest.

The Ordnance Survey of London.—The report of the progress of the Ordnance survey for the past year has been issued. It states that the plans of London on the scale of 60 in. to a mile are now complete. They are drawn on 326 full-sized sheets of paper, and probably form the largest and most complete plan of a city ever produced. Of these plans, 144 sheets have been engraved and published, and the remainder are in progress.

Railways and Working-class Dwellings. An artizan opponent of the Mid-London Railway writes to complain that "nearly 200 families, chiefly of the labouring classes, are being turned out of their homes at a short notice," in the vicinity of the Holborn Viaduct, in order to make room for the new station of the London, Chatham, and Dover railway. He urges that families who are weekly tenants should receive compensation for being summarily ejected.

A Relic of Exeter House, Derby, has been advertised for sale. It consists of the entire lining of the "council chamber," which was wainscoted with dark oak from floor to ceiling, adorned with pilasters in the doorways and casements, and finished with heavy cornices. The wood, according to the local *Advertiser*, is in good condition.

Docks at Portishead.—A contemporary is informed that the whole of the capital required for the completion of the docks at Portishead has been subscribed, and refers to the fact as showing that the promoters of the scheme have the greatest confidence in the work they have undertaken. It appears that only 5,000*l.* of the entire sum have now to be made up.

Public Baths on the Thames.—Mr. Ayrton and the Thames Conservancy have, it appears, consented to the construction of a bath off Battersea Park; and the company which has undertaken the work intends fitting up another (provided, of course, with a filtering apparatus) close to the Embankment, between the Temple and Waterloo Bridge.

Monument in Dublin to the late Lord Mayo.—A meeting has been held in Dublin, for the purpose of making preparations to erect a monument to the late Lord Mayo.

Church at Winterton, near Brigg.—Complaints have reached us of the manner in which "restoration" is being carried on here without professional advice.

Sale of Sites in Northampton.—A number of freehold plots of building-ground, situate in the new street leading from the Town-hall to the new Northampton and Bedford Railway Station, have been sold. Lots 1 to 8 were sold at from 3s. to 3s. 8d. per foot by private contract. Lot 9 (14,620 ft.), was sold by auction, at 2s. 6d. per foot; lot 10 (1,080 ft.), at 4s. 6d. per foot; lot 11 (2,970 ft.), at 3s. 6d. per foot; lot 12 (2,200 ft.), at 4s. 6d. per foot; lot 13 (10,408 ft.), at 3s. 6d. per foot; and lot 14 (1,040 ft.), at 3s. 1d. per foot. Lots 11 to 14 are about the centre of the east side of the new street, between Angel-lane and St. John-street. Lot 9, the most extensive piece, and which was purchased by Mr. Pickering Phipps, runs from the New-street into St. John's-street on the west side. Lot 10, bought by Mr. John Collier, forms the opposite corner.

Practice makes Perfect.—Mr. Bessemer, giving evidence before a committee of the Society of Arts, the other day, said, I have observed the sleight of hand that men acquire in various mechanical arts where they have a certain thing to do, and that only; and it is really marvellous how, in three or four weeks, a man will do with ease what would have been pronounced an utter impossibility. Take, for example, the forging of steel. A man will take a bar of steel, which has to be forged into an octagon shape, and he will pass it under a heavy hammer, striking about 300 blows a minute, and will turn it exactly one-eighth of a revolution at each stroke, and the whole of the bar is forged with the greatest exactitude, though he has to alter the angle every 300th part of a minute.

New Roman Catholic Schools at South Stockton.—The foundation-stone of new schools to be dedicated to St. Patrick has been laid here on a piece of ground between Gilmore and Westbury streets, near Mandall-road. The schools will be built of plain red brick, the architects being Messrs. Goldie & Child, of London; the clerk of the works is Mr. Atkin, of Leeds; and the contractor for the whole of the work, Mr. J. F. Craggs. The building will accommodate 300 children; will cost about 800*l.*; and is expected to be finished in July.

The New Post-office, Chester.—At a recent meeting of the Town Council it was unanimously resolved, "That a communication be addressed to the proper Governmental department, expressing the hope of the council that the new post-office, proposed to be erected in St. John-street, may be so designed as to harmonise with the architectural features peculiar to the City."

The Severn Tunnel.—The Severn Tunnel Railway Bill empowers the Great Western Railway Company to provide and subscribe the whole of the spare capital of 750,000*l.* required for the undertaking. The opposition has been withdrawn, and the Bill will come before the chairman of Ways and Means as an unopposed Bill.

TENDERS

For mansion for Mr. R. Davies, M.P., at Treborth, Menai Bridge. Mr. R. G. Thomas, architect:—

William Williams	£12,995 0 0
Evan Williams	11,967 0 0
Roberts & Co.	11,035 0 0
Parry	11,024 0 0
Owen	9,326 0 0
John Williams	9,132 0 0
Thomas & Son	8,760 0 0
Rowlands (accepted)	8,230 0 0

For a farmhouse at Nether Exe, near Exeter, for Mr. C. Hill. Mr. J. T. Bressey, architect:—

Stephens & Son (accepted)	£1,860 0 0

For triple cottages and outbuildings at Noke Farm, near Islip, Oxon. Mr. James H. Money, architect:—

Manning, Brothers	£472 0 0
W. & J. Payne	425 0 0
Selby	408 0 0
Hatwell	401 9 0
Stone	395 0 0
Horne	394 0 0
Cruse	386 17 0
Morris	383 14 9
Walters	373 0 0
Long	373 0 0
Stevens & Pullin	355 0 0
Fathers (accepted)	291 10 0

For a brick wall and the setting back of fences, for the Windsor Local Board of Health:—

Goodchild	£212 0 0
Kelly	159 0 0
Hollis	140 18 0
Sturgess	149 15 0
Dalton	149 10 0
Reavell	145 0 0

For Hospital for Sick Children, Great Ormond-street. Mr. E. M. Barry, architect:—

Lucas, Brothers	£39,965 0 0
Trollope	39,634 0 0
Cubitt & Co.	38,900 0 0
Higgs	37,650 0 0
Foster	36,920 0 0
Booth	36,480 0 0
Smith & Co.	36,463 0 0
Holland & Hannen	36,223 0 0
Perry & Co. (accepted)	35,890 0 0

For rebuilding premises in Fenchurch-street. Mr. T. C. Clarke, architect. Quantities supplied by Mr. King:—

Hill, Keddell, & Waldram	£8,976 0 0
Brass	8,896 0 0
Coleman	8,753 0 0
Turner & Sons	8,734 0 0
Merritt & Ashby	8,652 0 0
Pritchard	8,619 0 0
Browne & Robinson	8,449 0 0
Myers & Sons	8,273 0 0
Newman & Mann	7,696 0 0

For villa residence, at Hill-lane, Southampton. Messrs. W. & J. Jurd, architects:—

Ware	£950 0 0
Brinton & Bone	930 0 0
Rowland & Laver	880 10 0
Stevens	876 0 0
Gambling	830 0 0
Lewis	814 0 0
Bunney	788 0 0
Martin & Son	730 0 0
Crook	729 0 0

For residence, shop, stores, and stables, at Millbrook, near Southampton. Messrs. W. & J. Jurd, architects:—

Toogood	£870 0 0
Kimber	829 10 0
Spicer	794 10 0
Rowland & Laver	776 0 0
Lewis	765 0 0
Crook	749 0 0
Martin	714 0 0

For villa residence at Mortlake, for Mr. C. Lee. Messrs. Pain & Clark, architects. Quantities supplied by Mr. E. Morfee:—

Henshaw	£1,230 0 0
Crab	1,198 0 0
Manley & Rogers	1,140 0 0
Cook & Green	1,109 0 0
Aries	1,090 0 0
Aviss & Co. (accepted)	1,029 0 0
Sawyer (too late)	1,019 0 0

For alterations at the Albemarle Hotel, Albemarle-street, Piccadilly. Mr. J. Crawley, architect. No quantities:—

Simpson & Son	£895 0 0
Reby	448 0 0
Paley	414 0 0
Nightingale	396 0 0
Bamsey	383 0 0
Emery	359 0 0
Carmody	349 0 0
Pickus	310 0 0

For new house, for Mr. H. Bigsby, at Todhurst Farm Pulborough, Sussex. Mr. Wells, architect:—

Humphrey	£1,116 0 0
Wady & Hammond	999 0 0
Longley	970 0 0
Dewdney	953 18 0
Terry	930 0 0
Robinson	918 7 6
Baker	892 14 0
Mason & Bristy	883 0 0
Puzey & Filewood (accepted)	820 0 0
Washington	675 0 0

For boundary-walls, to enclose surplus land at the Lambeth Union Workhouse, Kennington-lane. Messrs. R. Parris & T. W. Aldwinckle, architects:—

Whitehead	£1,055 0 0
Valks	1,049 0 0
Nightingale	977 0 0
Tyerman	898 0 0
Goff	898 0 0
Yates	893 0 0
Dover	875 10 0
Crockett	839 0 0
Prout	795 0 0

For villa residence at Bolton-le-Sands, near Lancaster, for William Jackson, M.D. Mr. Stephen Shaw, architect:—

Masons', Wallers', Excavators', and Drainers' Departments.

Hayton (accepted)	£436 0 0

Carpenter and Joiner's Department.

Parkinson (accepted)	£395 0 0

Plasterers' and Slaters' Departments.

Hartley (accepted)	£232 0 0

Plumbers', Painters', Glaziers', Gasfitters', and Bellhangers' Departments.

Abbott (accepted)	£126 10 0

For the extension of the Sewage Purification Works, Hertford. Mr. T. W. Grindle, engineer. Quantities supplied by Mr. Timmis:—

Moore	£2,735 0 0
Strickson	2,700 0 0
Norris	2,630 0 0
Potter	2,586 0 0
Bugbird	2,500 0 0
Ritson	2,470 0 0
Harris (accepted)	2,243 0 0

For the front portion of the Athenæum, Camden-road. Mr. F. R. Meeson, architect:—

Jackson & Shaw	£3,251 0 0
Henshaw	3,210 0 0
Newman & Mann	3,192 0 0
Scrivener & White	3,187 0 0
Kelly, Brothers	3,130 0 0
Mann	3,089 0 0
Perry	3,040 0 0
Manley & Rogers	2,997 0 0
Wood	2,897 0 0
Nightingale	2,790 0 0
Southcott & Co.	2,625 0 0
Gregory & Knight	2,550 0 0
Bleasé*	2,183 0 0

* Understood to be withdrawn.

For the interior of the Elephant and Castle Theatre of Varieties, in the New Kent-road. Messrs. Dean, Son, & Matthams, architects:—

Cooke & Groom	£3,500 0 0
Roy	3,259 0 0

For residence, coach-house, stable, and approaches, at Snaresbrook, Essex, for Mr. G. F. H. Clark. Mr. W. Powell, architect:—

Pavitt	£1,550 0 0
Thorpe	1,520 0 0
Hunt & Elkington	1,450 0 0
Cook & Groome	1,400 0 0
Leatherdale*	1,150 0 0

* Accepted, for residence only.

For stabling for eleven horses, coach-houses, and living-rooms above, for Lord Auckland, in Buckingham-row. Mr. W. S. Champion, architect. Quantities supplied by Messrs. Woodzell & Colcutt:—

Ennor	£1,449 0 0
Cooke & Green	1,313 0 0
Smith	1,287 0 0
Newman & Mann	1,265 0 0
Scrivener & White	1,254 0 0
Wagner (accepted)	1,120 0 0

For two houses and shops, at Leytonstone, Essex, for Mr. Cullen. Mr. J. W. Forge, architect:—

Cains	£1,450 0 0
Brown	1,250 0 0
Ingham	1,095 0 0

For repairs, painting, decorations, &c., to house at Herne-hill, Norwood, for Mr. Moss Isaacs. Mr. J. D. Hayton, architect:—

Pearce	£899 0 0
Blott	765 0 0
Maxwell	729 0 0
Deacon	685 0 0
Richards (accepted)	433 0 0

For enlarging the United Methodist Free Church, Mills-street, Vauxhall. Mr. S. J. Stedman, architect:—

Richards	£475 0 0
Keast	420 0 0
Mallett (accepted)	395 0 0

For additions to house, High-street, Battersea, for Mr. William Griffin:—

Baker (accepted)	£210 0 0

For warehouse and drying-shed, Russell-street, Bermondsey, for Messrs. Axtell & Co. Mr. G. Elkington, architect:—

Coleman	£1,089 0 0
Little	1,057 0 0
Deavin	1,025 0 0
Preston (accepted)	895 0 0

For three warehouses in Fetter-lane, Holborn. Mr. W. S. Witherington, architect:—

Eaton & Chapman	£3,257 0 0
Mark	3,088 0 0
Little (too late)	3,075 0 0
Robbins & Co.	2,890 0 0
Elkington	2,850 0 0

For stabling, coach-house, &c., Kendall's-mews, Portman-square, for Mr. J. Taylor. Mr. W. S. Witherington, architect:—

Mark	£317 0 0
Brown	298 0 0
Eaton & Chapman	290 0 0
Cole	285 0 0
Bamford	275 0 0
Little	235 0 0

Offices, Ludgate Circus.—Messrs. Perry & Co.'s tender for Messrs. Cook & Sons' offices at Ludgate-circus, as reduced, has been accepted at 14,000*l.*

No. 7, Bucklersbury.—Mr. G. S. Pritchard says his name should be added to the list given by us, and that his tender, 1,793*l.*, has been accepted.

TO CORRESPONDENTS.

W. S. W.—S. J. S.—F. V.—S. W. G.—Expertus.—T. B.—R. M.—A. B.—L. & T.—E. F.—L. & Son.—J. S.—J. L.—A. R. P.—H. J. P.—W. C.—A. B.—O. B.—E. S.—T. G. J.—Rev. Mr. E.—S.—T. A. S.—G. B.—S. S.—N. & Son.—T. W. A.—R. G. T.—G. S. P.—Perry & Co.—A. W. (we cannot take mere assertion on trust).—Property in Ideas (next week).—S. D. W. (shall be engraved. Send a section).—N. C. (plans of various theatres will be found in our volumes).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests of course with the authors.

Bath and other Building Stones of Best Quality.—RANDELL, SAUNDERS, & CO. Limited, Quarrymen and Stone Merchants. List of Prices at the Quarries and Depôts, also Cost of Transit to any part of the United Kingdom furnished on application to
Bath Stone Office, Corsham, Wilts.—[ADVT.]

Ashton & Green, Slate and Slab Merchants and Quarry Agents.—Shippers, Merchants, and Contractors furnished with Price-lists of every description of ROOFING and MANUFACTURED SLATE, Railway-rates, &c. Agents for London and Country for the Sale of the celebrated WHITLAND ABBEY GREEN SLATES. Drawings and Prices of A. & G.'s RED RIDGE TILES, specially prepared for use with these Slates, on application.—Offices and Show-rooms, 14 and 15, Bury-street, St. Mary Axe, London, E.C.—[ADVT.]

Turret Clocks.—Mr. Streeter, 37, Conduit-street, London, W., Manufacturer of Turret Clocks (with gravity or dead-beat escapement) for Churches and Public Buildings. Estimates and plans on application. Price:—Village clocks, from 15*l.*; church clocks, from 40*l.* The wheel-work throughout these clocks is of best hard brass or gun-metal. No iron wheels used. Timekeeping and durability guaranteed. Wholesale Entrance—Burlington Steam Works.[ADVT.]

Architects, before committing themselves to any system of Warming, should send to TRUSWELL, BROTHERS, & HOLDEN, 100, Nottingham-street, Sheffield, for a prospectus of their Improved Patent Hot-Air Apparatus.[ADVT.]

FOR SALE, the "BUILDER," complete, from 1855 to 1871 inclusive, with odd numbers (8 vols. bound). Cost 17*l.* 13s.
Also the "BUILDING NEWS," 1860 to 1862 inclusive, and 1865 to 1871 inclusive, with odd numbers (three years bound). Cost 7*l.* 16s.
Any reasonable offer will be accepted, for cash only.—Address, BUILDER, care of Mr Hullands, Buckingham Palace-road, Pimlico.

THE QUARTERLY REVIEW, No. 264, is published THIS DAY.
CONTENTS.
I. THE STATE OF ENGLISH ARCHITECTURE.
II. THOMAS CARLYLE.
III. TRADE WITH CHINA.
IV. MILTON.
V. MODERN SCEPTICISM—THE DUKE OF SOMERSET.
VI. THE BRITISH PARLIAMENT, ITS HISTORY AND ELOQUENCE.
VII. DIARY OF A DIPLOMATIST.
VIII. EDUCATION, SECULARISM, AND NONCONFORMITY.
IX. CONCESSION TO THE UNITED STATES.
JOHN MURRAY, Albemarle-street.

MISS BRADDON'S NEW NOVEL.
The New Novel by the Author of "Lady Audley's Secret," &c.
In 3 vols. at all Libraries.
ROBERT AINSLEIGH.

With 9 Plates and 47 Woodcuts, 8vo. 10s. 6d. (postage, 9d.)
THE STUDENT'S GUIDE to the PRACTICE of MEASURING and VALUING ARTIFICERS' WORKS: containing copious Memoranda for the Valuation of Labour and Materials in all branches of the Building Trades. By EDWD. DOBSON. New edition, re-written, with additions, by E. WYNDHAM TARN, M.A.
London: LOCKWOOD & CO. 7, Stationers' Hall-court, E.C.

Recently published, demy 8vo. with Forty-seven Wood Engravings, cloth, price 8s. 6d. (postage, 4d.)
THE SCIENCE of BUILDING: an Elementary Treatise on the Principles of Construction. Especially adapted to the requirements of Architectural Students. By E. WYNDHAM TARN, M.A. Architect.
"No Architectural Student should be without this hand-book of constructional knowledge."—*Architect.*
London: LOCKWOOD & CO. 7, Stationers' Hall-court, E.C.

Just published, demy 8vo. strongly bound in cloth, with 165 fine Woodcuts, price 12s. 6d. (postage, 5d.),
PRACTICAL GEOMETRY for the ARCHITECT, ENGINEER, SURVEYOR, and MECHANIC. By E. WYNDHAM TARN, M.A.
"A work of remarkable merit."—*Builder.*
"An excellent treatise, of value not merely to students, but to practical men."—*Engineering.*
"No book with the same object in view has ever been published in which the clearness of the rules laid down and the illustrated diagrams have been so satisfactory."—*Scotsman.*
London: LOCKWOOD & CO. 7, Stationers'-hall-court, E.C.

PERFECTION in BOOKKEEPING.—Builders and others desiring a really good system can have a SET of MODELS for BUILDERS' BOOKS by DOUBLE ENTRY, to which was awarded the Prize offered in "The Builder," No. 1,180, and which has been adopted by many large firms. Also, a modified arrangement by Single Entry, suitable for small Builders.—Address, E. A. 4, St. George's-road, Regent's Park, London.
TESTIMONIALS.
"I have tried your system of bookkeeping, and like it very much."—G. D.
"Your system seems thoroughly to meet our requirements."—J. & M. H.
"I like your system very much, and shall adopt it."—W. W.
"Having adopted your system of bookkeeping, we can recommend it to the builders generally. Having had it in use over twelve months, we find it takes much less time to keep the accounts than formerly."—R. & M.
"I received yours in due course. They appear to show an excellent mode of bookkeeping. Your directions are most explicit, and sufficiently explanatory."—G. C.
"Messrs. R. & S. have examined your system, and consider it simple, clear, and very satisfactory."
"I greatly appreciate your plan and system of keeping builders' books, and I consider that it has only to be made known to be generally adopted."—T. H.
"Last June we had your improved system of bookkeeping. Since then we have been keeping the accounts according to it. I consider it 'ne plus ultra.' It meets the requirements of contract work perfectly."—T. R. H.
"I received your models. They fully meet my expectations."—A. B.
"Your system of bookkeeping appears to me to be excellent."—G. G.
"The model form of books you sent me is very good."—G. C.
"Your plan of bookkeeping has given me many good ideas."—J. H. C.

NEW ELEMENTARY WORK ON PHYSICS BY PROF. GANOT.
On SATURDAY next, in crown 8vo. with 403 woodcuts, price 7s. 6d.
NATURAL PHILOSOPHY for GENERAL READERS and YOUNG PERSONS; being a Course of Physics divested of Mathematical Formulæ, expressed in the language of daily life, and illustrated with Explanatory Figures, familiarly elucidating the Principles and Facts. Translated and edited from Ganot's "Cours de Physique," with the author's sanction, by E. ATKINSON, Ph.D., F.C.S. Professor of Experimental Science, Staff College.
London: LONGMANS, GREEN, & CO. Paternoster-row.

THE EDINBURGH REVIEW, No. CCLXXVI. APRIL, was published on MONDAY last.
CONTENTS:—
I. BURN'S ROME AND THE CAMPAGNA.
II. THE ROYAL INSTITUTION.
III. GUIZOT'S MEMOIR OF THE DUKE DE BROGLIE.
IV. MR. MIALL ON DISESTABLISHMENT.
V. LETTERS AND DISCOVERIES OF SIR CHARLES BELL.
VI. OCEANIC CIRCULATION.
VII. THE WORKS OF JOHN HOOKHAM FRERE.
VIII. THE AUTOBIOGRAPHY OF HENRY, LORD BROUGHAM.
IX. THE CLAIMS OF THE UNITED STATES.
London: LONGMANS & CO. Edinburgh: A. & C. BLACK.

Price 5s.
DILAPIDATIONS. A Text Book in Tabulated Form. With Copious Index.
By BANISTER FLETCHER, Author of "Model Houses."
E. & F. N. SPON, 48, Charing-cross.

LITHOGRAPHED BILLS of QUANTITIES, SPECIFICATIONS, &c. — ROBERT J. COOK & HAMMOND have made such arrangements for this special description of Lithography, that orders to any extent are completed in a given time, under the personal superintendence of one of the firm, thus ensuring accuracy and promptness. Plans and Drawings of every description Copied, Traced, or Lithographed.—ROBERT J. COOK & HAMMOND, Draughtsmen, Lithographers, &c. 29, Charing-cross.

PARTNERSHIP. — WANTED, a PARTNER, in an old-established JOBBING BUILDER'S BUSINESS, able to command about 1,500*l.* and to take the cash and counting-house department.—Address, Y. F. B. care of Mr. G. Street, No. 30, Cornhill, E.C.

TO PAINTERS AND DECORATORS.
WANTED, a PARTNER, to take the Painting, Graining, and Decorating Department in an established Plumber, Glazier, and Painter's Business, in an improving town in the Midland counties.—Address, J. J. care of Mr. Reeve, Printer, Stratford-on-Avon.

WANTED, by an Architect and Surveyor, an ASSISTANT for about a week or a fortnight. He must be thoroughly acquainted with the preparation of drawings.—Address, stating salary required, to H. P. 194, East-street, Walworth.

WANTED, immediately, a competent DRAUGHTSMAN. Must be able to make complete working drawings from rough sketches, Gothic preferred.—Address, with age, references, and salary, M. M. care of Mr. Wheeler, Newsagent, Manchester.

WANTED, immediately, a good Draughtsman. Details and construction.—Apply, personally, to DRURY & LOVEJOY, 35, Bucklersbury, between Eleven and One on Saturday, 20th inst.

TO ARCHITECTS' ASSISTANTS.
WANTED, immediately, for a limited period, a first-class DRAUGHTSMAN, accustomed to the Italian style and detail, and possessing a thorough knowledge of construction. It will be useless for any to reply but those perfectly competent, and in the above particulars especially. State age, terms, experience, and references.—Address, 143, Office of "The Builder."

WANTED, an ASSISTANT (Architect and Surveyor) competent to work under the principal, land measuring, plan taking, preparing working drawings, &c. Neat handwriting indispensable. Permanent engagement.—Apply by letter, stating terms, &c. 69, Office of "The Builder."

TO ARCHITECTS' ASSISTANTS.
WANTED, in an Architect's Office, twenty miles from London, for a permanency, an experienced practical ASSISTANT, first-class Draughtsman, and Designer, having a good knowledge of domestic architecture in all styles. It is requested that none but those whose qualifications and references are first-rate, will address 124, Office of "The Builder."

TO PRIME COST CLERKS.
WANTED, the ASSISTANCE of a BUILDERS' CLERK, of good practical knowledge and experience, to commence and keep a set of books on a checking system, and to take out quantities. One who has been employed where machinery is used would be preferred.—Apply by letter, stating age, salary, and last employment, to the Saw Mills, Sevenoaks.

WANTED, an AGENT, having a connexion with London Architects and Builders, to sell a material extensively used in the building trade.—Apply by letter, addressed A. K. No. 85, Charlwood-street, Pimlico, London.

WANTED, in a Builder's Office, an intelligent YOUTH. Must be quick at figures, write a good hand, and have some knowledge of tracing drawings.—Address in own handwriting, A. B. 76, Worship-street, E.C.

TO PAINTERS.
WANTED, a good PAINTER, to take the Charge of a Job in the country.—Apply to Mr. STORR, No. 9, Duke-street, St. James's.

WANTED, in the Office of a BUILDER and DECORATOR, a respectable YOUTH about 13 or 14. He would have a good opportunity of grounding himself in office duties and business routine.—Apply to ROSS & LYON, Builders, &c. 112, Fulham-road, S.W.

TO PLUMBERS, &c.
WANTED, a Practical THREE-BRANCH HAND, with a knowledge of bookkeeping. Must have had experience in superintending jobs.—Apply by letter to Mr. G. S. STEARMAN, Surveyor, Park-road, Norbiton.

WANTED, a first-class GASFITTER and BELLHANGER, used to the Jobbing Trade. A permanency to a steady and useful man.—Apply, by letter, stating age, wages, and references, to H. B. Grosvenor Library, 35, Chapel-street, Belgrave-square.

TO DECORATORS.
WANTED, ONE or TWO first-class HANDS. Must be well used to stencil work and good at fitch lining.—State wages, &c. to No. 125, Office of "The Builder."

TO PLUMBERS, &c.
WANTED, a thoroughly good PLUMBER, accustomed to old and new work, one well up in all branches, and who can do hot-water and gas fittings, plain zinc-work, &c. Constant work.—Applications, stating age, wages required, &c. with references, to be made to Dr. DAVIS, Medical Superintendent, Burntwood Asylum, near Lichfield, from whom any further particulars may be had.

TO PARENTS AND GUARDIANS.
WANTED, by a CIVIL ENGINEER and ARCHITECT in the country, with sewerage works in hand, a PUPIL.—Address, C. M. Office of "The Builder."

TO CARVERS AND GILDERS.
WANTED, a first-class CARVER and GILDER, who can undertake every branch of the business.—Apply to Mr. W. S. SPANTON, Bury Saint Edmunds.

TO JOINERS AND CARPENTERS.
WANTED, TWENTY or THIRTY good JOINERS and FIXERS, for twelve months certain. Wages, 4s. 6d. a day; overtime, 6d. per hour.—Apply at the Saw-mills and Joinery Works, Sevenoaks, Kent.

WANTED, an active and competent SHOP FOREMAN.—Apply, by letter only, stating age, particulars of former engagements, and salary required, to Mr. B. B. SAPWELL, No. 9, Shepherd-street, Mayfair, W.

TO CARPENTERS AND JOINERS.
WANTED, a GENERAL SHOP FOREMAN, in the country.—Apply, by letter, giving terms and references, to Mr. A. REYNOLDS, Builder, Milborne Port, Sherborne, Dorset

WANTED, a WORKING FOREMAN of PAINTERS and DECORATORS, for a Mansion in the country. Apply, stating wages required and references, to CLARK & SMALLWOOD, Wootton Wawen, near Henley-in-Arden.

TO MASONS.
WANTED, a WORKING FOREMAN, to manage a branch business.—Apply by letter, stating references, to No. 111, Office of "The Builder."

WANTED, a FOREMAN, a BRICKLAYER by trade, to conduct a job near London.—Address, stating wages required, with reference from last employer, to No. 118, Office of "The Builder."

TO FIRE BRICK MAKERS.
WANTED, a FOREMAN, for extensive FIRE BRICK WORKS in the County of Durham. None but experienced parties need apply.—Address, S. T. U. care of Mr. J. Bailey, 7 Horsemarket, Darlington

SEWAGE FARM.—The Swindon New Town Local Board require a competent Person to undertake the MANAGEMENT of a FARM of 105 acres, irrigated with sewage. A suitable dwelling-house will be provided for the manager.—Apply, stating wages required, with testimonials and references, to Mr. J. C. TOWNSEND, Clerk to the New Swindon Local Board, Swindon.

FOREMAN of PAINTERS.—WANTED, in the North of England, a MANAGER, to superintend the decorating department of a first-class business. A good situation would be offered to a thoroughly competent man.—Address, A. B. C Kennedy & Co. Advertising Agents, Manchester.

TO GLASS WRITERS AND EMBOSSERS.
GOOD, quick PENCIL HAND WANTED. Address, W. GIBBS, 108, Union-street, Borough.

A JUNIOR CLERK WANTED in a Builder's Office, aged about 18, to book time and materials, measuring out, &c. Must have been in a Builder's Office, and a good penman.—Address, stating age and salary expected, to No. 94, Office of "The Builder."

A BUILDER in Lancashire is in WANT of a GENERAL FOREMAN or MANAGER. He must have a good practical knowledge of building in all its branches, as well as of measuring and estimating, and must be competent to take entire management of the business in the occasional absence of the principal. State age, salary required, and references.—Address, W. 113, "Guardian" Office, Manchester.

PUPIL.—A CIVIL ENGINEER, having works of considerable magnitude in operation, has a VACANCY in his Office for a PUPIL. The district in which the works are situated being one of considerable extent and importance, affords unusual opportunities for the acquirement of engineering experience.—Address, A. B. 163, Strand, W.C.

WANTED, by a thoroughly practical Man, a RE-ENGAGEMENT as GENERAL FOREMAN of CARPENTERS and JOINERS. Town or country, or to go abroad. Fifteen years' experience. Good reference.—Address, T. S. No. 3, Duke-street, West Smithfield, E.C.

WANTED, by a thoroughly Practical Man, a RE-ENGAGEMENT as FOREMAN of BRICKLAYERS. Has no objection to work himself, or will take work by the piece. Good reference to last employer.—Address, A. T. 7, London-street, London-road, Southwark.

TO BUILDERS, CONTRACTORS, AND OTHERS.
WANTED, by a thoroughly experienced Man, a SITUATION as Out-door GENERAL FOREMAN. Just finished a large job. Five years' testimonials from his late employer.—Address, 137, Office of "The Builder."

TO BUILDERS AND OTHERS.
WANTED, by a thoroughly practical and energetic Man, Bricklayer by trade, an ENGAGEMENT as FOREMAN of a JOB, or would take brickwork by the piece. Is well up in setting out work from drawings, measuring up, &c. Town or country.—Address, A. M. 85, Lillington-street, Pimlico, S.W.

TO BUILDERS AND CONTRACTORS.
WANTED, by a thoroughly practical and energetic Man, a RE-ENGAGEMENT as GENERAL FOREMAN or CHARGE of JOB. Thoroughly versed in drawings, setting out or measuring up any description of work, and good management of workmen. Carpenter and joiner. Aged 37. Reference from present employer.—Address, S. F. Post Office, Ashford, Middlesex.

TO ARCHITECTS AND SURVEYORS.
WANTED, by the Advertiser, an ENGAGEMENT in an Architect's or Surveyor's Office in London. Has a fair knowledge of design and surveying.—Address, H. S. I. Post office, Dulwich, S.E.

TO CONTRACTORS AND BUILDERS.
WANTED, by the Advertiser, a RE-ENGAGEMENT as OUT-DOOR FOREMAN (carpenter and joiner by trade), or would take piecework in either of the above branches. Town or country. Aged 30. First-class reference.—Address, No. 112, Office of "The Builder."

TO BUILDERS, CONTRACTORS, AND OTHERS.
WANTED, by the Advertiser, seventeen years of age, a RE-ENGAGEMENT in an Office (Town preferred) where he would have an opportunity of improving himself in keeping the books, taking out quantities, estimating, &c.—Address, A. B. C. 7, Argyle-street, King's-cross, N.

TO CONTRACTORS AND BUILDERS.
WANTED, by the Advertiser, a RE-ENGAGEMENT as CLERK or CASHIER. Thoroughly conversant with the duties, preparing plans and details, quantities, measuring up works, and levelling. Town or country. Aged 28. Good references.—Address, 928, Office of "The Builder."

TO BUILDERS AND OTHERS.

WANTED, an ENGAGEMENT, by a Young Man, as GRAINER and MARBLER. No objection to fill up his time with Painting if required.—Address, C. E. 191, Globe-road, Mile-end.

TO GLASS MERCHANTS, &c.

WANTED, an ENGAGEMENT in a Glass Warehouse, to do the embossing, glass-writing, and lead-glazing.—Address, care of H. C. 51, City-road, London, E.C.

TO CIVIL ENGINEERS, &c.

WANTED, a permanent ENGAGEMENT as DRAUGHTSMAN. Has been engaged for the past sixteen years on plans, &c. for large public gas, water, and drainage works, and previously two years with an architect. Good references, &c.—Address, C. E. 24, Stockbridge-terrace, Pimlico, London, S.W.

TO ARCHITECTS.

WANTED, a RE-ENGAGEMENT as CLERK of WORKS.—Address, 54, Office of "The Builder."

WANTED, a RE-ENGAGEMENT, as GENERAL FOREMAN. Good references. Town or country. Address, T. B. 16, York-street, Covent-garden.

TO BUILDERS, &c.

WANTED, a RE-ENGAGEMENT, as BUILDER'S CLERK. Aged 26. Well used to office routine, measuring up work, billing quantities, or keeping cost of work. Good draughtsman. Direct personal references.—Address, H. E. 13, Camden-cottages, Camden-road, N.

WANTED, a RE-ENGAGEMENT, as GENERAL FOREMAN, CLERK OF WORKS, or CHARGE of a JOB. Town or country. Joiner by trade. First-class references and testimonials.—Address, W. W. 13, Stamford-road, Fulham, S.W.

TO BUILDERS, &c.

WANTED, a RE-ENGAGEMENT, by a thoroughly competent BUILDER'S ASSISTANT. Well up in estimating, measuring, and accounts. First-class testimonials and references. Aged 34.—Address, 64, Office of "The Builder."

TO BUILDERS.

WANTED, a RE-ENGAGEMENT, as FOREMAN of WORKS, or would take STONEWORK. Good references. MASON by trade.—Address, 145, Office of "The Builder."

WANTED, a RE-ENGAGEMENT as GENERAL FOREMAN. Well up in City work. Five years with present employer. First-class reference.—Address, T. W. 50, Brunswick-terrace, Grosvenor-park, Walworth.

TO BUILDERS, DECORATORS, AND CONTRACTORS.

WANTED, a RE-ENGAGEMENT, by a competent BUILDER'S CLERK. Well up in the routine of the Office, Bookkeeping, and General Office work. Practically acquainted with every branch of the trade; been used to a jobbing business. Age 27. Good references.—Address, M. 44, Balms-road, Southgate-road, N.

WANTED, a RE-ENGAGEMENT, by an energetic Young Man, as GENERAL OUT-DOOR ASSISTANT, Prime-Cost Clerk, or Foreman. Used to measuring, taking out quantities, and keeping time. Has a practical knowledge of every branch of the trade. Salary moderate.—Address, X. R. 29, Cuiford-road, Kingsland, N.

TO BUILDERS.

WANTED, a RE-ENGAGEMENT, by a competent SHOP FOREMAN, of twelve years' experience. Is systematical, firm, of unexceptionable character and abilities, and well up in figures and drawing. No objection to the country.—Address, 914, Office of "The Builder."

WANTED, an immediate RE-ENGAGE-MENT by an experienced DRAUGHTSMAN and DESIGNER, whose thorough and varied experience suits him to all classes and styles of architectural assistance. — Address, ALPHA, Post-office, Barnstaple.

WANTED, EMPLOYMENT, by a first-class GRAINER and MARBLER. Piecework.—Address, A. G. 37, Willes-road, Kentish-town, N.W.

WANTED, EMPLOYMENT, by a Young Man, CARPENTER, at Bench, or Jobbing. Used to repairing furniture. Wages not so much an object as regular employment.—Address, W. C. 8, Devonshire-terrace, Blake's-road, Peckham Grove.

TO BUILDERS AND CONTRACTORS.

WANTED, EMPLOYMENT, by the Advertiser, to Work a Planing Machine, Saw Bench, or Ransome & Co.'s General Joiner. No objection to the country.—Address, A. B. 113, Vauxhall Bridge-road, London.

WANTED, EMPLOYMENT, by a good handy JOBBING HAND (aged 37), in PLUMBING, PAINTING, GLAZING, and ZINCWORK. Will make himself useful, and fill up time in other branches, or anything else required. Wages very moderate.—Address, PLUMBER, 22a, Gloucester-grove, Gloucester-road, Brompton, S.W.

WANTED, immediate EMPLOYMENT, as DRAUGHTSMAN, COLOURIST, and QUANTITY CLERK. Aged 39. Married. Town or country. No objection to a country builder's, contractor's, &c. Terms moderate.—Address, D. 1, Mountvillas, Fuckeridge, Ware.

TO BUILDERS, &c.

WANTED, a SITUATION, by an active elderly Man, as CLERK or otherwise, and to make himself generally useful. Good references.—Address, W. S. care of Mr. Sprunt, 905, Old Kent-road.

WANTED, a SITUATION, as CLERK of WORKS. First-class testimonials. No objection to go abroad. Address, J. W. 6, Friar-terrace, Curzon-street, Derby.

WANTED, a SITUATION, as CLERK of WORKS, or GENERAL FOREMAN, by a thoroughly practical and experienced man. Carpenter by trade. Age 38. No objection to the country or abroad.—Address, M. J. care of Mr. Frith, Stationer, 172, Adrian-terrace, Finborough-road, West Brompton.

TO BUILDERS AND OTHERS.

WANTED, a Constant SITUATION as THREE-BRANCH HAND. Can take the entire charge of each department, measure up work, and give estimates. Can do gas-fitting.—Address, H. H. 23, Holly-street, Dalston, N.E.

TO NOBLEMEN, BUILDERS, AND OTHERS.

WANTED, by an experienced, practical Man, a SITUATION as BUILDER'S FOREMAN, or CLERK of WORKS, either to go abroad or on an estate. Good testimonials. Address, G. B. 6, Milverton-street, Kennington-road, S.E.

WANTED, by an energetic Business Man, an ENGAGEMENT as MANAGER, COLLECTOR, or in any place of trust in a good firm. Timber or Glass and Lead Warehouse preferred. Undoubted references and security if required.—Address, S. J. S. 5, Esther-place, West-road, Forest-hill.

WANTED, by a steady Young Man, a SITUATION as IMPROVER to a GENERAL SMITH. Useful at the fire or vice. Can have seven years' recommendation if required.—Address, G. F. 1, Langley Cottage, West Fields, Barnes, Surrey.

TO COUNTRY PAINTERS.

WANTED, by a steady Man, a SITUA-TION, as PAINTER, GLAZIER, and PAPERHANGER. Generally useful. Wages moderate.—Address, T. HUGHES, Exhibition Coffee-house, Park-side, Knightsbridge.

TO PLUMBERS AND BUILDERS.

WANTED, by a good PLUMBER and GASFITTER, a Constant SITUATION. Understands all kinds of iron pipe, bath, well, and water-closets, hotwater work, and plain zincwork. No objection to fill up time at painting if required. Town or country.—Address, R. P. 3, Marsh's Cottages, Meeting House-lane, Peckham, Surrey.

WANTED, by a Married Man, aged 28, a PLACE in a JOBBING SHOP. Plasterer by trade. Has a thorough knowledge of jobbing brickwork and masonry work. No objection to the country.—Address, A. B. 21, Marlborough-square, Chelsea, S.W.

TO BUILDERS, PLUMBERS, AND OTHERS.

WANTED, by a Young Man, who is a thoroughly good PLUMBER, a SITUATION or JOB. Town, country, or abroad.—Address, PLUMBER, 101, Prince of Wales-road, Kentish-town, London.

TO PLUMBERS, PAINTERS, AND GRAINERS.

WANTED, a Young Man, of good cha-racter, as WORKING PARTNER with an established Builder. One that can command about 150*l.*; keep builders' accounts as well. An able workman preferred.—Address, with name in full, to 97, Office of "The Builder."

TO BUILDERS.

WANTED, by a Young Man (aged 21), a SITUATION in the OFFICE of the above. Well up in prime cost, measuring up, &c.—Address, 75, Office of "The Builder."

WANTED, by a Young Man (aged 26), a SITUATION in a Builder's or Contractor's Office. Ten years' experience. Good references. Well up in quantities, estimates, &c.—Address, B. C. 367, Edgware-road, W.

TO ESTATE OWNERS AND HOUSE DECORATORS.

WANTED, by a Young Man, a constant SITUATION as WORKING FOREMAN or MANAGER in a good General Shop. A good three-branch hand, gasfitter, plain zinc-worker, and paperhanger. First-class hand for general shop or estate. Ten years' reference. — Address, H. DAVEY, 8, Wenlock-terrace, Wenlock-road, City-road, London.

TO ARCHITECTS AND SURVEYORS.

WANTED, by an ASSISTANT, EMPLOY-MENT in the above Offices. Is a neat Draughtsman, and can prepare plans and detail drawings from rough sketches. Good references can be given.—Address, B. P. the Priory, Fratton Bridge, Portsea.

WANTED, by a MASON, of thoroughly practical experience, a RE-ENGAGEMENT as FOREMAN of MASONS or GENERAL FOREMAN of WORKS. Has carried out many large jobs in London and the provinces. Is thoroughly acquainted with church and other ecclesiastical works. Good references from late employer and other testimonials. Aged 45. Town or country.—Address, W. A. H. 25, Bride-lane Coffee-house, Fleet-street.

TO CARPENTERS AND BUILDERS.

THE Friends of a Youth, son of a late Builder, 15½ years of age, wish to place him with a respectable Firm as INDOOR APPRENTICE. He is a tall, strong lad, and has great aptitude for the trade. As no premium can be paid, but small wages will be expected.—Apply to Mr. H. COX, 15, De Beauvoir road, N.

TO ARCHITECTS AND SURVEYORS.

THE Advertiser is desirous of obtaining a SITUATION in above office. Three years' experience. Neat tracer and draughtsman. Small salary. Good reference.—Address, K. W. 3, College-avenue, Hackney.

TEMPORARY or PARTIAL ASSIST-ANCE.—An experienced CLERK, ESTIMATOR, and MEASURER offers his SERVICES. Well up in neglected accounts. No objection to a permanency.—Address, LESLIE, 39, Shepperton-street, Islington, N.

TO WRITERS AND DECORATORS.

SIGN WRITER (first-class) WANTS a SITUATION. Terms low for a permanency. Would fill up time.—Address, J. W. 17, Arthur-road, Stoke Newington.

TO BUILDERS.

SITUATION WANTED, in a BUILDER'S OFFICE, by a Young Man, aged 19, five years' experience. Good references.—Address, J. S. care of Mr. Powell, 1, Carrington-street, Mayfair, W.

STAIRS and HANDRAILING WANTED (first-class references) by THOS. DYER, 5, Branksome-road, Acre-lane, Brixton, S.

EVENING EMPLOYMENT required by a good DRAUGHTSMAN. Disengaged after Four p.m. Drawings of every description prepared, copied, or traced. Assistance given in quantities. Terms, 1s. 6d. per hour.—Address, A. B. No. 1, Boscobel-gardens, Regent's Park, N.W.

CLERK of WORKS.—WANTED, an im-mediate RE-ENGAGEMENT, by a thoroughly competent Man. Just completed large works in Nottingham. First-class references and testimonials. — Address, CLERK of WORKS, New Wesleyan Chapel, Mansfield-road, Nottingham.

AS CLERK, where assistance is required. Had two years' experience in a builder's office. Fill up time at the bench. Joiner by trade. Good reference. Age 24.—Address, W. D. 31, Robert-street, Hoxton.

A CLERK of WORKS, of very great expe-rience, middle aged, is desirous of an ENGAGEMENT. Address, T. W. care of Mr. Wilson, Bridge-avenue, Hammersmith.

A JUNIOR CLERK and TIMEKEEPER WANTED in a Builder's Office (aged about 20). Must be a quick and accurate accountant, and have been in a builder's office.—Apply (in confidence), stating present or last employer's address, and salary expected, 135, Office of "The Builder."

A GOOD SIGN WRITER and PENCIL HAND requires EMPLOYMENT.—Address, G. E. 16, Aston-street, Limehouse, E.

TO BUILDERS AND CONTRACTORS.

A BUSINESS-MAN, CARPENTER, thorough knowledge of all branches, SEEKS a SITUATION, as FOREMAN. Used to heavy works, machinery, quarrying, &c. Lately been building a school. Would take labour, or go abroad.—Address, A. B. care of Mr. W. Ellis, 17, Bridge-terrace, Harrow-road, Paddington, W.

AN ARCHITECT (in the City) requires a respectable YOUTH for general OFFICE WORK. Must be able to trace neatly, and write a good hand.—Apply, by letter, in own writing, to H. W. care of Housekeeper, 10, Basinghall-street, E.C.

TO ARCHITECTS AND SURVEYORS.

AN ARCHITECT, whose time is but partly occupied is desirous of rendering TEMPORARY ASSISTANCE in preparing working and finished drawings and specifications, either at his own office or elsewhere. Terms moderate.—Address, T. S. at Mrs. Seymour's, South-street, Bishop's Stortford, Herts.

TO ARCHITECTS.

A GENTLEMAN, well up in architectural practice, of above twenty years' experience, desires a permanent ENGAGEMENT. He is also a good quantity surveyor, prices out, and measures up work; can likewise undertake land surveying and levelling.—Address, 72, Office of "The Builder."

A YOUNG GERMAN ENGINEER, having passed his degrees at Stuttgart University, wishes for a SITUATION. Thoroughly understands the construction of steam-engines, &c. Good references.—Address, X. GEIGER, 300, Euston-road, N.W.

TO ARCHITECTS AND SURVEYORS.

A GERMAN ARCHITECT, aged 37, five years in England, who has illustrated English periodicals, wishes to obtain a permanent SITUATION in his profession, as DRAUGHTSMAN, CLERK of WORKS, or FOREMAN. He has had for many years past the management of the constructive portions of buildings, chiefly in Berlin, possesses a thorough knowledge of masonry, brickwork, and other building trades, is a good draughtsman and designer, and has had considerable practice of surveying and levelling. Unexceptionable references for integrity and capacity. Salary at the beginning no object.—Address, H. H. care of Mr. LEUNIG, 68, Upper Thames-street, City.

AN ENGAGEMENT, as a BUILDING MANAGER, or CLERK of WORKS, WANTED. Long experience in both capacities, also in Builders' book-keeping. Country preferred.—Address, WEDDLE'S, 12, Stockbridge-road, Winchester.

TO ARCHITECTS.

A GOOD DRAUGHTSMAN, having had four years' experience, seeks an ENGAGEMENT. Country not objected to. Terms moderate. Highest references.—Address, F. W. K. 13, Hobury-street, Chelsea, S.W.

AN experienced Builder and Surveyor wishes for EMPLOYMENT as GENERAL FOREMAN or CLERK of WORKS, in London, or elsewhere.—Apply to J. S. care of Messrs. Bridges, Santell, Heywood, & Co. Solicitors, 23, Red Lion-square.

TO PLUMBERS, BUILDERS, AND OTHERS.

AN experienced PLUMBER WANTS a SITUATION. Understands hot-water apparatus. Can do painting and glazing if required.—Address, J. S. 12, John-street, Back-road, Kingsland.

TO BUILDERS, PLUMBERS, &c.

A PLUMBER, accustomed to good work, new or jobbing, is in want of a SITUATION; is also a good gas and hot-water fitter and zinc-worker. Can give good references for sobriety and skill. Age 38.—Address, W. M. 14, Lonsdale-road, Westbourne-grove, Bayswater, W.

TO BUILDERS AND OTHERS.

A FIRST-CLASS practical MASON wants a RE-ENGAGEMENT, as BUILDER'S FOREMAN, Foreman of Masons, or otherwise. Twenty years' experience. Good testimonials and references.—Address, A. W. 5, Parkside-street, Battersea Park, London.

TO BUILDERS, ARCHITECTS, &c.

A THOROUGHLY practical, energetic, and persevering Man, Joiner by trade, is open to an ENGAGEMENT as GENERAL FOREMAN or CLERK of WORKS, in town or country. First-class reference. Well up in church work.—Address, A. B. 15, Davies-street, Berkeley-square, W.

TO BUILDERS AND CONTRACTORS.

A BUILDER, through changes in his business, can highly recommend a CLERK, who has been engaged with him upwards of six years as Cashier and General Clerk in the execution of large contracts and building works. He is well acquainted with all the duties of a builder's office, writes a good hand, is quick at accounts, very industrious and trustworthy.—Address, Mr. JOHN WALKER, Builder, 16, Leigham Court-road, West Streatham.

CONTRACTS—*Continued from p.* ii.

TENDERS are REQUIRED for a CON-GREGATIONAL CHAPEL at Sutton Valence, Kent. Quantities on application to Messrs. SULMAN & RHODES, 1, Guildhall Chambers, Basinghall-street, London, E.C.

TO SANITARY PIPE MANU-FACTURERS.—WANTED, SAMPLES and PRICES of GLAZED EARTHENWARE SANITARY PIPES, from 4 to 15 inches.—Address, JOHN W. FEREDAY, Surveyor, Town-hall, Wednesbury.

TO CONTRACTORS.—Builders wishing to TENDER for the ERECTION of the PROPOSED HOWELL HARRIS MEMORIAL CHAPEL, Trevecca College, South Wales, can see the plans at the College, and at my Office, on and after MONDAY, APRIL 15th, between the hours of TEN a.m. and FOUR p.m. Tenders properly endorsed to be sent in to the Rev. W. HOWELLS, Principal, Trevecca College, Tregarth, on or before SATURDAY, MAY 4th. The Committee do not bind themselves to accept the lowest or any other Tender. Should the Committee desire, the builder whose Tender may be accepted will have to provide sureties.

R. G. THOMAS, Architect, &c. Menai Bridge.

April 11th, 1872.

TO BUILDERS AND CONTRACTORS.

W. SELLS,

BRICKWORK POINTED and DRAWN, by Contract or otherwise, in Town or country, on the lowest terms.—16, Hope-street, George-road, Holloway, N.

R. DIXON,

GRAINER and MARBLER,

5, HUNTLEY-STREET.

Tottenham Court-road, London.

ESTIMATES FURNISHED.

DRAINAGE.—"THE UNIVERSAL FOUL AIR PURIFIER."—This Apparatus is intended to be fixed on a vent pipe leading from any soil pipe, drain, or sewer, thus ventilating same, and effectually purifying all the deleterious gases that may arise. They are cheap, durable, and simple in construction. Price 10s. each, to be had of S. LIDSTONE, 50, Old Bailey, London. Prospectuses on application.